Solaris™ 2.4
x86 Driver Update 10 Guide

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PC Card Hardware

About This Book

This document provides information about x86 hardware devices that are now supported on the Solaris™ 2.4 computing environment. Typically, as new drivers become available, they will be bundled with releases on separate Driver Update diskettes. The drivers may support the following types of devices: SCSI host bus adapters, IDE interface, network adapters, PC Card devices, and others, such as audio, SCSI tape devices, and serial ports. You can use the Driver Update diskettes to install a new system for the first time, or you can use them to update your installed Solaris 2.4 system with new drivers.

Note – Driver Updates are cumulative distributions. Although the "New Device Functionality" section in Chapter 1 describes what's been added since the last Driver Update, the "Driver Update Contents" section in Chapter 1 and the "PC Card Driver Update Contents" section in Chapter 2 provide a complete list of what will be installed. It is only necessary to install the current Driver Update to get the support described in this document.

Information regarding the availability of new drivers can be obtained by calling SunSoft's Automated Support System at 1-800-SUNSOFT (options 4,1,1) or by sending electronic mail to `support@cypress.West.Sun.COM`.

Before You Read This Book

This document contains additional device configuration information for newly supported hardware. The importance of properly configured hardware prior to installing Solaris is discussed in *x86 Device Configuration Guide*. This document assumes you have fully read and understood that guide; Appendix A, "Device Reference Pages," in this document is an addendum to that guide. Likewise, the installation instructions for this Driver Update are very brief and serve only to supplement the instructions found in *x86: Installing Solaris Software*.

How This Book Is Organized

A brief description of the contents of the Driver Update diskettes is followed by installation instructions for the new drivers, and detailed configuration instructions for the hardware devices that are supported by the new drivers.

Note – Even though the instructions for installing the new drivers are presented first, read and follow the appropriate hardware configuration instructions in Appendix A, "Device Reference Pages," before installing the new drivers. The hardware must be configured properly for the Solaris software to install and run correctly.

Chapter 1, "Solaris 2.4 x86 Driver Update 10," provides information about what is new in this release and how to install it.

Chapter 2, "Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support," provides information about the contents, installation instructions, and known problems for the PC Card support in this Driver Update.

Appendix A, "Device Reference Pages," provides device configuration information for the hardware supported by the drivers in this Driver Update. This appendix should be read and the hardware configured *prior* to installing the Driver Update software.

Related Books

You may need to refer to the following books when installing the Driver Update:

- *x86 Device Configuration Guide*
  Describes how to configure x86 devices before installing Solaris software.
- *x86: Installing Solaris Software*
  Describes how to install the Solaris software on x86 systems.
- *Solaris 2.4 Open Issues and Late-Breaking News*
  Describes late-breaking news about running Solaris software, including known problems with supported hardware or device drivers.
- *Solaris 2.4 x86 Hardware Compatibility List*
  Contains a list of supported hardware on Solaris 2.4 x86 systems.

How to Obtain Updated Hardware Compatibility Lists and Device Driver Information

Hardware Compatibility Lists and Driver Update releases (including related documentation) are produced periodically as support for new hardware becomes available. They are available from these sources:

- World Wide Web—Open URL `http://access1.Sun.COM`, and select "x86" and then "Solaris Intel (x86)."
- FTP—Use anonymous FTP to access `ftp.uu.net`, then go to `/vendor/sun/solaris/x86/2.4/`
- CompuServe—Type `go sunsoft` and go to the Solaris x86 library.

Note that the World Wide Web, CompuServe, and ASK-IT (below) also point to Support-provided installation and configuration information as well as answers to frequently asked questions.

Related Documentation Only

- Email Autoresponder—To obtain a Hardware Compatibility List or a Driver Update Announcement via email, send email to `hcl-index@Sun.COM` for a list of autoresponse aliases that return hardware support information.
- ASK-IT[1]—SunSoft's Automated Support Fax-on-Demand Service
  - In North America, call one of these numbers:
    1-800-SUNSOFT and choose options 4, 1, 1
    (310) 348-6219 and choose option 1
  - Outside North America, call one of these numbers and choose option 1:

Australia	61-2-844-5374
Japan	03-5717-2560
Taiwan	886-2-719-8069
United Kingdom	44-1494-510981

How to Obtain Technical Support

To obtain technical support:

- In North America, call 1-800-SUNSOFT and choose option 4.
- Outside North America, contact your technical support provider.

1. Includes the current Hardware Compatibility List, document No. 51201, which summarizes the current Driver Update, and document No. 81234, which lists *x86 Device Configuration Guide* Device Reference Pages so you can request those not available in Driver Updates.

Solaris 2.4 x86 Driver Update 10 — 1

Solaris 2.4 x86 Driver Update 10 adds new support for SCSI host bus adapters, the IDE interface, network adapters, audio cards, and PC Card devices. This chapter provides a brief description of what's new in this Driver Update, followed by a complete list of the contents, installation instructions, and release notes for all the drivers included in this release except PC Card devices.

Chapter 2, "Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support," contains additional information and installation instructions for the PC Card device support in this release.

Note – Before installing this Driver Update, the newly supported hardware devices should be installed and configured according to the instructions in Appendix A, "Device Reference Pages."

Also, read the "Release Notes" section before installing this Driver Update.

1

New Device Functionality

Device Drivers (SCSI HBA, IDE Interface, Network)

Table 1-1 lists device drivers in Solaris 2.4 x86 Driver Update 10 that contain new functionality not included in previous Driver Updates. For a complete list of drivers included in this release, see Table 1-2.

Table 1-1 New and Updated Drivers in This Driver Update

SCSI HBA Drivers	
`adp`	Updated driver to include support for the Adaptec AHA-2940U and AHA-2940UW and to add a caveat
`ncrs`	Updated support for Compaq 32-Bit Fast-SCSI-2, Compaq Integrated 32-Bit Fast-SCSI-2; new support for Compaq Integrated 32-Bit Fast-SCSI-2/P, Compaq Integrated 32-Bit Fast-Wide SCSI-2/E, Compaq Integrated 32-Bit Fast-Wide SCSI-2/P, Compaq 32-Bit Fast-Wide SCSI-2/P
Ethernet Network Drivers	
`dnet`	Updated to include support for SMC EtherPower 8432BT, 8432BTA, and 10/100 9332DST; Cogent EM100TX and EM110TX; Znyx EtherXtend ZX342
`elink`	Updated 3Com EtherLink 16 (3C507) Device Reference Page to supply additional configuration information
`nei`	Change in enabling batch file
`nfe`	Bug fixes and DB-15 connector now works with NetFlex-2 DualPort ENET
FDDI Network Drivers	
`cbtnf`	New Cabletron F7069

Note – AsanteFAST 10/100, SMC EtherPower (8432BT, 8432BTA, and 10/100 9332DST), Cogent EM960TP/EM960C (TP connector only), Cogent EM100TX and EM110TX, D-Link DE-530CT, and Znyx EtherAction ZX312 and EtherXtend ZX342 boards have been successfully tested with the `dnet` driver for network adapters based on the DECchip 21040 Ethernet, DECchip 21041 Ethernet, and DECchip 21140 Fast Ethernet controllers. Other adapters may work with this driver and additional boards will be tested in the future.

However, some boards have failed to work with the `dnet` driver (for example, quad-port boards from Cogent and Znyx). Support for these and other DECchip-based adapters will be included in future releases of this driver.

Corrections to Known Problems

For a list of the known problems that are fixed in this Driver Update, see the `README` files that get installed in the patch directories `/var/sadm/patch/`<*patch number*>.

See "Driver Update Distribution Diskette" later in this chapter for a complete list of the contents of this Driver Update.

PC Card Driver Support

The PC Card support in Solaris 2.4 x86 Driver Update 10 is identical to the contents of the previous Driver Update. If you have already installed the PC Card distribution from Solaris 2.4 x86 Driver Update 8 or later, there is no reason to install the PC Card portion of this Driver Update. For more information about the PC Card support in this release, see Chapter 2, "Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support." New information has been added to the PC Card Device Reference Pages in Appendix A.

Driver Update Contents

Solaris 2.4 x86 Driver Update 10 contains four diskettes labeled:

- "Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette"
- "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette"
- "Solaris 2.4 x86 Driver Update 10 Distribution Diskette"
- "Solaris 2.4 x86 Driver Update 10 PCMCIA Diskette"

The Boot and Distribution diskettes are intended to be used with a Solaris 2.4 x86 CD or a Solaris 2.4 net install image. The "Solaris 2.4 x86 Driver Update 10 PCMCIA Diskette" can only be used on systems that already have the Solaris 2.4 operating environment installed.

The contents of the PCMCIA diskette is discussed in Chapter 2, "Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support."

Driver Update Boot Diskettes

The Solaris 2.4 operating environment can be installed on x86 systems with the two new boot diskettes labeled “Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette” and “Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette.”

These diskettes contain scripts and configuration files that enable you to boot and install your system using one of the newly supported devices. During installation of the Solaris software, one or more of the Driver Update Distribution diskettes will be read.

Driver Update Distribution Diskette

The Driver Update *Distribution* diskette (labeled “Solaris 2.4 x86 Driver Update 10 Distribution Diskette”) is read when the Driver Update Boot diskettes are used to install Solaris. Alternatively, the Driver Update Distribution diskette can be used without the boot diskettes to add new drivers to an existing x86 system running Solaris 2.4.

The Driver Update Distribution diskette contains the drivers listed in Table 1-2. A new or updated Section 7 manual page for each of the drivers[1] that added new device support will also be installed in the appropriate `man` page directory during installation.

Table 1-2 Device Drivers in This Driver Update

SCSI HBA Drivers	
`adp`	Adaptec AHA-2940, AHA-2940W, AHA-2940U, AHA-2940UW, AHA-3940, and AHA-3940W PCI-to-Fast SCSI host bus adapters, and motherboards that integrate multiple Adaptec AIC-787*x*, AIC-7880, or AIC-7850 controller chips, such as the DECpc XL 590 and the Samsung Magic Power SPC8500P
`aha`	Updated Device Reference Page for enabling AHA-154*x*CP
`aic`	Adaptec AIC-6360 driver that supports the AHA-1530P, AHA-1532P, AHA-1522A, AHA-1520A, AHA-1510A, and the 6360-based SCSI controller embedded on the Sound Blaster 16 SCSI-2

1. The manual page for the Solaris `ieef` driver (Intel EtherExpress Flash32) will also be installed with this Driver Update. This driver is included on the Solaris 2.4 x86 CD.

Table 1-2 Device Drivers in This Driver Update *(Continued)*

`blogic`	BusLogic SCSI HBAs (BT-440C, BT-445C, BT-445S, BT-542B, BT-545C, BT-545S, BT-742A, BT-746C, BT-747C, BT-747S, BT-757S, BT-946C)
`corvette`	IBM SCSI-2 Fast/Wide Adapter/A
`eha`	Updated Adaptec AHA-174*x* EISA HBAs driver to correct some known problems
`esa`	Updated Adaptec AIC-7770/AHA-274*x*/AHA-284*x* driver to fix some known problems
`iss`	Tricord Systems Intelligent SCSI Subsystem Controllers
`mcis`	Updated IBM Micro Channel HBA driver to correct some known problems
`ncrs`	Updated driver to support the NCR 53C815 SCSI controller and the embedded NCR 53C710 SCSI host bus adapters on Siemens Nixdorf PCE-5S systems; updated to support systems that use PCI Configuration Mechanism #1; updated support for the Compaq 32-Bit Fast-SCSI-2 and Compaq Integrated 32-Bit Fast-SCSI-2, and new support for Compaq Integrated 32-Bit Fast-SCSI-2/P, Compaq Integrated 32-Bit Fast-Wide SCSI-2/E, Compaq Integrated 32-Bit Fast-Wide SCSI-2/P, and Compaq 32-Bit Fast-Wide SCSI-2/P
`pcscsi`	AMD PCscsi (Am53C974), PCscsi II (Am53C974A), and PCnet-SCSI (Am79C974) PCI host bus adapters integrated on system motherboards such as the HP Vectra XU and the Compaq DeskPro XL systems
`trantor`	Trantor T348 MiniSCSI Plus Parallel HBA
SCSI Disk Arrays/RAID Controllers	
`csa`	Compaq SMART SCSI Array Controller integrated on the system motherboard of the Compaq family of ProSignia, ProLiant, and Systempro Servers
`dpt`	Updated driver to add support for the PM-2122 and PM-3222 EISA host bus adapters and the PM-2024, PM-2124, PM-2124W, PM-3224, and PM-3224W PCI SCSI RAID adapters

Table 1-2 Device Drivers in This Driver Update *(Continued)*

`mlx`	Updated driver to add support for the Mylex DAC960P PCI adapter and the IBM DMC960 RAID controllers (IBM SCSI-2 RAID and IBM SCSI-2 Fast/Wide Streaming-RAID Adapter/A)
IDE Interface Driver	
`ata`	Updated IDE interface driver to support ATAPI-compliant CD-ROM drives and enhanced IDE disk drives; bug fixes
SCSI Tape Driver	
`st`	SCSI tape target driver
Diskette Driver	
`fd`	New support for medium density format on 3.5-inch high-density diskettes used by NEC-DOS
Keyboard Driver	
`kd`	Updated to prevent the screen from going into unreadable white-on-white mode.
Ethernet Network Drivers	
`dnet`	DEC 21040, 21041, 21140 Ethernet (AsanteFAST 10/100, Cogent EM100TX, Cogent EM110TX, Cogent EM960C, Cogent EM960TP, D-Link DE-530CT, SMC EtherPower 8432BT, SMC EtherPower 8432BTA, SMC EtherPower 10/100 9332DST, Znyx EtherAction ZX312, Znyx EtherXtend ZX342)
`eepro`	Intel EtherExpress PRO Ethernet
`elink`	Updated 3Com EtherLink 16 (3C507) driver to correct some known problems
`elx`	Updated 3Com EtherLink III (3C5*x*9) driver to include support for the 3C509B
`iee`	Updated Intel EtherExpress 16 driver to fix some known problems and add support for 16C, 16TP, MCA, MCA TP
`ieef`	Intel EtherExpress PRO/100 (82556)
`nee`	Novell/Eagle Technology NE3200 Ethernet
`nei`	Novell/Eagle Technology NE2000, NE2000plus Ethernet and Clones

Table 1-2 Device Drivers in This Driver Update *(Continued)*

`nfe`	Compaq NetFlex-2 DualPort ENET and NetFlex-2 ENET-TR Controllers
`pcn`	AMD PCnet driver to support integrated motherboards based on the AMD PCnet-ISA and PCnet-PCI controller chips
`riles`	Racal InterLan ES3210/ES3210 TP Ethernet
`smc`	Updated driver to include support for the SMC EtherEZ Ethernet adapter and to fix some known problems
`smce`	Updated SMC Elite32 driver to correct some known problems
`smceu`	SMC Elite32 Ultra (8232)
`smcf`	SMC Ether 10/100 (9232)
FDDI Network Driver	
`cbtnf`	Cabletron FDDI F7069
Audio Driver	
`sbpro`	Updated audio driver to fix some known problems and add support for the Sound Blaster AWE32 audio card
Serial Ports Driver	
`asy`	Updated to fix problems and enhance the hardware flow control functionality; the functionality works regardless of the CLOCAL flag bit

Table 1-3 lists the MP kernel modules included in this Driver Update.

Table 1-3 MP Kernel Modules in This Driver Update

`compaq`	MP module to add support for the Compaq ProLiant (TriFlex) machines.
`pcplusmp`	An updated MP module that fixes some problems on Intel MPSpec 1-1 compliant systems.
`syspro`	An updated MP module for Compaq Systempro that fixes some probe conflicts on Compaq ProLiant systems.
`tpf`	MP module to add support for Tricord ES4000 MP machines. A manual page for `tpf(7)` is installed.

Driver Update PC Card Diskette

See Chapter 2, “Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support,” for PC Card devices supported in this release.

Release Notes

For a complete list of the known problems that are fixed in this Driver Update, see the `README` files that get installed in the patch directories `/var/sadm/patch/`<*patch number*>.

Caution – If you have a Racal InterLan ES3210 network card, which uses the `riles` driver, do not install this Driver Update. **(1235289)**

If you have an SMC Elite32 EISA Ethernet (8033), which uses the `smce` driver, do not install this Driver Update. **(1237460)**

If you are using Solaris as your router, and you have two Solaris machines acting as routers on the same network, do not install this Driver Update. **(1236654)**

- The Adaptec AHA-3940 has been certified by Adaptec to run on specific system platforms. Our testing has shown that Solaris works properly on some of those systems and not on others. If you encounter problems running Solaris on an Adaptec-approved platform with the AHA-3940, contact your technical support provider.
- If you are installing Solaris 2.4 on one the following Intergraph systems, you will need to modify the Driver Update 10 Boot diskettes to workaround a known PCI/EISA I/O space overlap problem on systems that contain an NCR chip:
  - ISMP22 Server
  - TD-5 Personal Workstation
  - TD-4 Personal Workstation
  - 100 MHz TD-3 Personal Workstation

  This must be done prior to installing the Solaris 2.4 operating environment. See “Modifying the Solaris Driver Update Boot Diskettes” later in this chapter.

- The Novell NE2000 and NE2000plus are sensitive to autoprobing by other drivers and require autoprobe reset sequences that may disturb other cards. For this reason, the Solaris `nei` driver is disabled by default, and special steps must be taken to enable it. See "Modifying the Driver Update 10 Boot Diskettes" and "Enabling Support for Controllers After Installing Solaris x86" on the "Novell NE2000, NE2000plus Ethernet and Clones" Device Reference Page in Appendix A.
- Due to conflicts, the IBM SCSI-2 Fast/Wide Adapter/A should not be installed until the Solaris `mcis` driver is disabled. See "Modifying the Driver Update 10 Boot Diskettes" and "Enabling Support for Controllers After Installing Solaris x86" on the "IBM Micro Channel SCSI-2 Fast/Wide Adapter/A " Device Reference Page in Appendix A.
- Due to conflicts, probing for the Adaptec AHA-284*x* VLB SCSI adapter has been disabled. See "Adding Support for AHA-284x Devices" and "Modifying the Solaris Driver Update Boot Diskettes" on the "Adaptec AIC-7770/AHA-274*x*/AHA-284*x* HBAs" Device Reference Page in Appendix A.

Solaris 2.4 x86 Jumbo Kernel Patch

Users of Driver Update 10 should install the Solaris 2.4 x86 jumbo kernel patch ID `101946`, revision 12 or later. This patch resolves problems known to cause user-level programs to core dump. This patch is posted on:

- The WWW `(http://access1.sun.com/recpatches/2.4_x86.html)`
- The Internet server `sunsolve1.Sun.COM` in the directory `/pub/patches` via anonymous FTP

Install the most recent revision of patch `101946`. You can obtain this from the patches subdirectory of the Solaris 2.4 x86 installation CD, or from either of the sites mentioned above. A `README` file and `installpatch` script provide a description and instructions for installing the patch on your system.

Modifying the Solaris Driver Update Boot Diskettes

Before you install the Solaris operating environment on your system, it may be necessary to modify the Driver Update Boot diskettes to remove or enable certain drivers that conflict with each other. For example:

- There is a known PCI/EISA I/O space overlap problem on systems that contain an NCR chip. This affects the Intergraph ISMP22 Server and the TD-5, TD-4, and 100 MHz TD-3 Personal Workstations.
- The Novell NE2000/NE2000plus Ethernet adapters are sensitive to autoprobing by other drivers and require reset sequences that may disturb other network cards. For this reason, the `nei` driver is disabled by default. See the “Novell NE2000, NE2000plus Ethernet and Clones” Device Reference Page in Appendix A for instructions for enabling this device.
- The Solaris `mcis` driver interferes with the proper operation of the IBM SCSI-2 Fast/Wide Adapter/A. To avoid conflicts, the Solaris `mcis` driver must be disabled. See the “IBM Micro Channel SCSI-2 Fast/Wide Adapter/A” Device Reference Page before installing this adapter.
- The Solaris `elink` driver may interfere with the proper operation of PCnet-ISA adapters, such as those installed on the Intergraph TD-1, TD-2, and TD-3 Personal Workstations. If you are installing the Solaris software over a network that uses a PCnet-ISA adapter, and you experience problems with the network hanging, it may be necessary to exclude the `elink` driver from the Driver Update Boot diskettes before attempting to install again. See the “AMD PCnet Ethernet (PCnet-ISA, PCnet-PCI)” Device Reference Page in Appendix A for instructions.
- Probing for Adaptec AHA-284*x* VLB SCSI adapters has been disabled by default to avoid probing conflict with some PCI cards at certain I/O addresses. To enable such probing, see the “Adaptec AIC-7770/AHA-274x/AHA-284x HBAs” Device Reference Page in Appendix A for the steps to take.

There are scripts on the Driver Update Boot diskettes for driver modification. The diskettes must be modified using DOS. As a precaution, you should make a backup of the original Boot diskettes before running the special script.

1. **Boot DOS on your system.**
2. **Insert a blank 3.5-inch diskette into drive A: and format it:**
   ```
   format a:
   ```
3. **Insert “Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette” into drive A:, make a copy of it, and remove the diskette:**
   ```
   diskcopy a: a:
   ```

4. **Label the copy of the Boot diskette as “Modified.”**
   For example:
   “Modified Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette for Intergraph Systems.”

5. **Insert another blank 3.5-inch diskette into drive A: and format it:**
   `format a:`

6. **Insert “Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette” into drive A:, make a copy of it, and remove the diskette:**
   `diskcopy a: a:`

7. **Label the copy of the Boot diskette as “Modified.”**
   For example:
   “Modified Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette for Intergraph Systems.”

8. **Store your original Boot diskettes in a safe place.**

9. **Insert the copy of “Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette” (the second diskette) into drive A:.**
   Make sure the diskette is writable because the contents will be modified.

10. **Change to drive A: (remember DOS is still running):**
    `a:`

11. **Run the batch command file.**
    The batch files are run from the second diskette, but some of these files will ask you to reinsert “Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette” by prompting “Please switch to boot diskette #1.”

- To support the Intergraph ISMP22, TD-5, TD-4, or 100 MHz TD-3, run the `intrgrph.bat` command file:
  `intrgrph`

- See Appendix A, “Device Reference Pages,” for information on NE2000/NE2000plus support, IBM SCSI-2 Fast/Wide Adapter/A support, PCnet-ISA conflicts, and AHA-284*x* probing.

Support for Medium-Density Diskettes

Solaris x86 supports medium density, the 1.2-Mbyte, 77-cylinder, 1024-byte sector format on 3.5-inch high-density diskettes, used by NEC-DOS. This feature has two hardware requirements.

First, the diskette drive must be one of the supported, dual-speed, high-density drives. The currently supported diskette drives are: Teac FD-235HG, Teac FD-505, and Sony MPF420-6 (requires special cable to PC/AT diskette interface because drive is hardwired to DriveSelect0).

Second, the diskette controller must be one of the supported enhanced controllers that provide a programmable DENSEL output. The currently supported diskette controllers (or multi I/O chips) are: SMC FDC37C665GT and SMC FDC37C666GT; National Semiconductor PC87303VUL, PC87322VF, and PC87332VLJ (other National Semiconductor chips that use the PC8477 core: PC87306, PC87311, PC87312, PC87323, and PC87334).

This feature is enabled by editing the `fd.conf` file and assigning a nonzero value to the `mode_3D` property for the appropriate drive entry.

Note – An additional patch, `101924-02`, is required to access 1.2-Mbyte diskettes using the NEC-DOS file system. This patch updates the `pcfs` module.

Support for SCSI Tape Driver

The `st` driver is a SCSI tape device driver that replaces the old `sctp` tape driver supported in Solaris 2.4 x86. The `st` driver was developed on the SPARC™ platform and was previously supported only on Solaris 2.4 SPARC systems. It now replaces the `sctp` driver on x86 systems, providing the following features:

- Full compatibility between Solaris SPARC and Solaris x86 platforms
- Stability, robustness, and increased SCSI tape drive support
- Field extensiblity; support for new tape drives can be added by editing a configuration file (`st.conf`)
- Support for tape control features required by commercial backup software, such as Legato Networker

- Support for configurable write buffering (as an option)

In addition, significant interoperability testing was conducted to ensure that tapes written with the older `sctp` driver can still be read by the new `st` driver. For more information about configuring tape drives, see the "SCSI Tape Drives" Device Reference Page in Appendix A.

Support for More Than Four Serial Ports

If you want to use more than four serial ports, you need to update two system files. Both `/etc/iu.ap` and `/platform/i86pc/kernel/drv/asy.conf` need to be modified to reflect the number of devices supported by the Solaris `asy` driver. The necessary steps are described below:

1. **Edit the** `/etc/iu.ap` **file and replace the following two lines:**

```
asy           131072   131075   ldterm ttcompat
asy           0        3        ldterm ttcompat
```

   with:

```
asy           131072   131083   ldterm  ttcompat
asy           0        11       ldterm ttcompat
```

   These changes reflect the addition of eight new ports to the system.

2. **Edit the file** `/platform/i86pc/kernel/drv/asy.conf`**.**
   For each new serial port, add a line similar to the following, replacing *IRQ* and *IOADDR* with the appropriate IRQ and I/O address:

```
name="asy" class="sysbus" interrupts=12,IRQ reg=IOADDR,0,0 ioaddr=IOADDR;
```

   For example, if the 8-port version of the BocaBoard is configured to use addresses 100 through 140 for its eight serial ports, the following lines would be added:

```
name="asy" class="sysbus" interrupts=12,7 reg=0x100,0,0 ioaddr=0x100;
name="asy" class="sysbus" interrupts=12,7 reg=0x108,0,0 ioaddr=0x108;
name="asy" class="sysbus" interrupts=12,7 reg=0x110,0,0 ioaddr=0x110;
name="asy" class="sysbus" interrupts=12,7 reg=0x118,0,0 ioaddr=0x118;
name="asy" class="sysbus" interrupts=12,7 reg=0x120,0,0 ioaddr=0x120;
name="asy" class="sysbus" interrupts=12,7 reg=0x128,0,0 ioaddr=0x128;
name="asy" class="sysbus" interrupts=12,7 reg=0x130,0,0 ioaddr=0x130;
name="asy" class="sysbus" interrupts=12,7 reg=0x138,0,0 ioaddr=0x138;
```

3. **Perform a reconfiguration boot.**

```
# touch /reconfigure
# reboot
```

For more information, see `/platform/i86pc/kernel/drv/asy.conf`, `asy(7)`, and `autopush(1M)`.

Choosing the Hard Drive Your System Will Boot From After Installation

The choice of slot (PCI or EISA) or BIOS ROM base address may affect which hard drive your system chooses as the boot disk. Make sure you have configured your system so that the BIOS chooses the hard drive you want to boot from when your system powered on.

Known Problems

Caution – The installation program's default size for the `root` file system may not be large enough to produce a working system on some PCI-based systems with new or updated drivers. When installing this Driver Update, you should not accept the default file system partitioning. Instead, press F4 to Customize the file system partitions, then allocate at least 20 Mbytes for the file system.

- QA testing uncovered a problem in the firmware used with the AHA-2940U, AHA-2940UW, and embedded HBAs that use the AIC-7880 controller chip (models of the Adaptec HBAs that use the AIC-7870 chip are not affected). This firmware problem may occasionally cause the SCSI bus to hang in a state from which it can not be recovered without doing a hard reset, potentially corrupting data on your disks. So far this problem has only occurred on test systems after several hours of very heavy I/O stress testing using multiple SCSI devices. Because of the serious nature of this problem, an updated `adp` driver will be provided as soon as this problem is fixed.
- The BIOS on some systems is unable to "warm boot" Solaris when PCI bus master devices have been in use. These systems must be reset, either by pressing a reset button or power cycling the system.
- **(1192152, 1184097)** The `vold` program may fail when it tries to access a non-audio CD-ROM with certain CD-ROM players. The symptoms may be a failure to mount the CD-ROM, or a system panic if the Solaris `mlx` or `dpt` driver is being used.
  Workaround: Disable the Solaris Volume Management software when one of the following CD-ROM drives is installed:
  - Chinon CDS 535
  - NEC MultiSpin 4X
  - Pioneer DRM-604X
- **(1203834)** Installing over a network using a 3Com EtherLink 16/16 TP adapter will not work if the card is set to TURBO mode.
  Workaround: Set the card to non-TURBO mode before the initial network install. Once installed, set it back to TURBO mode to take advantage of maximum performance during normal operation.

Installing Solaris Using the Driver Update Diskettes

To install Solaris 2.4 on an x86 system, follow the instructions in *x86: Installing Solaris Software* using the diskettes labeled “Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette” and “Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette.”

The procedure for installing Solaris using the Driver Update Boot diskettes is almost the same as that described in *x86: Installing Solaris Software*. Boot using the “Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette” instead of the “Solaris 2.4 for x86 Boot” diskette. During the installation process, you’ll be prompted to insert the “Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette.” There will be many times during the early booting process when the system will read data from the diskettes, but the sequence of interaction with the user remains the same. Early in the boot process there will also be warning messages for each new driver whose device is not on the system being installed. The warning messages will look like the following:

```
Warning: forceload of drv/xxx failed.
```

Such warning messages are expected and can be ignored.

Before the installation program begins to install the Solaris software, you will be able to choose whether you want the system to reboot after installing the software.

Late in the install process, after all the standard packages have been installed, new driver packages will be installed from the Driver Update Distribution diskette. At the start of that phase of the installation, one of the install scripts will ask you to insert the Driver Update Distribution diskette into the drive. After the new driver packages have all been added, the script will ask you to remove the diskette from the drive. In each case, it will wait for you to perform the requested action and press Enter.

After this is accomplished, the system will reboot as usual (unless you chose the option not to reboot after installing the software). When it comes up, the new device drivers should be completely installed and functional.

Note – If you have a Sound Blaster card, there may be additional steps you need to take after the Solaris software is installed on your system. See the Appendix A "Sound Blaster Pro" or "Sound Blaster 16/Sound Blaster AWE32" Device Reference Pages for further instructions.

To install the PC Card support, see Chapter 2, "Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support," for instructions.

Adding New Drivers After Solaris Is Installed

If you already have the Solaris 2.4 software installed, the simplest way to add a new drivers to your system is to obtain the Driver Update *Distribution* diskette and install it as a patch on your Solaris 2.4 x86 system.

Note – Before adding new drivers, the newly supported hardware devices should be installed and configured according to the instructions in Appendix A, "Device Reference Pages."

Note – If you have an Adaptec AHA-284*x* SCSI controller, you must edit the `/etc/system` file as described in step 5.

Follow these procedures to install the new drivers:

1. **Insert "Solaris 2.4 x86 Driver Update 10 Distribution Diskette" into drive 0.**

2. **Become root.**

3. **Use `cpio` to copy files off the diskette and run the installation script.**
The following commands assume Volume Management is running on your system. If it isn't, `volcheck` should *not* be run and the device name of the diskette drive needs to be replaced with `/dev/diskette0`.

To see if Volume Management software is running, type:
`ps -e | fgrep vold`
For more information about managing diskettes and drives, see *Solaris 2.4 Open Issues and Late-Breaking News*.

```
# mkdir /tmp/Drivers
# cd /tmp/Drivers
# volcheck &
# cpio -iduBI /vol/dev/diskette0/unlabeled
Please remove the diskette from drive zero.
Press <ENTER> when ready.
```

4. **Remove the diskette from drive 0, and type the following:**

```
# ./installdu.sh
```

5. **Before rebooting, if you have an AHA-284*x* SCSI controller, use an editor to add the following line to the `/etc/system` file:**

```
set esa:esa_vlb_probe = 0xffff
```

6. **Follow the instructions on the screen to shut down the system.**
The instructions include how to restart the system.

7. **A second reboot may be required if you have installed new hardware that uses a new network driver. See "Replacing a Network Card."**

When the system comes up, the new device drivers should be completely installed and functional. However, there may be additional steps to take:

- If you want to support an NE2000 or NE2000plus Ethernet adapter, you must enable the driver before the card is installed and configured. See the "Novell NE2000, NE2000plus Ethernet and Clones" Device Reference Page in Appendix A for instructions for enabling this device.
- If you want to support an IBM SCSI-2 Fast/Wide Adapter/A, you must disable the Solaris `mcis` driver before the adapter is installed and configured. See the "IBM Micro Channel SCSI-2 Fast/Wide Adapter/A" Device Reference Page in Appendix A for instructions.

- If you have a PCnet-ISA adapter and you experience network problems, you may need to disable another driver so that it won't interfere with the operation of the PCnet-ISA adapter. See the "AMD PCnet Ethernet (PCnet-ISA, PCnet-PCI)" Device Reference Page in Appendix A for instructions.
- If you are replacing a network card, see "Replacing a Network Card."
- If you have a Sound Blaster card, there may be additional steps to take after installing the Driver Update. See "Enabling Support for Sound Blaster Audio Cards After Installing Solaris or the Driver Update" for instructions.

To install PC Card support, see Chapter 2, "Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support," for instructions.

Disabling Drivers After Installing the Driver Update

It is sometimes necessary to disable certain Solaris drivers so they won't interfere with the proper operation of other hardware. For example:

- The Solaris `mcis` driver interferes with the proper operation of the IBM SCSI-2 Fast/Wide Adapter/A. Before you can install and configure this newly supported adapter, the `mcis` driver must be disabled. See the "IBM Micro Channel SCSI-2 Fast/Wide Adapter/A" Device Reference Page in Appendix A for instructions.
- The Solaris `elink` driver may interfere with the proper operation of PCnet-ISA adapters. If you already have Solaris installed on your system, and after installing this Driver Update you experience network problems with your PCnet-ISA adapter, try disabling the Solaris `elink` driver. See the "AMD PCnet Ethernet (PCnet-ISA, PCnet-PCI)" Device Reference Page in Appendix A for instructions.

Replacing a Network Card

If you are replacing a network card with one that uses a different device driver, rename the `/etc/hostname.`*olddriver*`0` file to `/etc/hostname.`*newdriver*`0` before rebooting a second time. For example, when replacing a 3Com EtherLink III card with an SMC EtherEZ card, do the following as root:

```
# mv /etc/hostname.elx0 /etc/hostname.smc0
```

Now perform a reconfiguration boot to make your changes take effect:

```
# touch /reconfigure
# reboot
```

Solaris 2.4 x86 Driver Update 10 PC Card (PCMCIA) Support

2

Note – If you have installed Driver Update 8 or later, you don't need to refer to this chapter.

A description of the contents of the PC Card (PCMCIA) support included in this Driver Update is followed by a brief overview of PCMCIA hardware, installation instructions, release notes, and troubleshooting information. Appendix A, "Device Reference Pages," provides additional information about the PC Card device configuration in this release.

Read through the entire chapter once before installing the PC Card support in Solaris 2.4 x86 Driver Update 10.

PC Card Driver Update Contents

Solaris 2.4 x86 Driver Update 10 contains one diskette labeled: "Solaris 2.4 x86 Driver Update 10 PCMCIA Diskette." The PC Card Driver Update diskette is intended to be used on Solaris 2.4 x86 systems only and contains the drivers listed in Table 2-1. A new Section 7 manual page for each of the drivers will also be installed in the appropriate manual page directory during installation.

Note – Support for a specific adapter chip does not guarantee that PC Card support will work on a platform, though it will increase the likelihood. Check *Solaris 2.4 x86 Hardware Compatibility List* to be certain.

Table 2-1 PC Card Drivers Supported in This Driver Update

PC Card Drivers	
`pcic`	Intel i82365SL PC Interface adapter driver that supports adapters based on the following chips: Intel 82365SL, Vadem VG365/VG465/VG468/VG469, Cirrus Logic PD6710/PD6720, Ricoh RF5C366, and Toshiba
`pcelx`	3Com EtherLink III (3C589) Ethernet PC Card driver
`pcram`	PC Card memory card driver that supports PC Card SRAM and DRAM devices
`pcser`	PC Card serial card device driver that supports PC Card modem and serial devices based on the 16550 UART and its variants

Appendix A contains Device Reference Pages that explain the configuration for each of the types of PC Card devices listed above.

The PC Card Driver Update also includes:

- `pcmcia`, the PC Card nexus driver that provides card and socket services for PC Card device drivers (such as `pcic`)
- `pcmem`, the PC Card memory card nexus driver that supports PC Card memory card client drivers (such as `pcram`)
- `pcmciad`, the PC Card user daemon that provides user-level services for `pcmcia` and PC Card client drivers

See `pcmcia(4)`, `pcmem(7)`, and `pcmciad(1M)`.

Other manual pages have been updated for PC Card support and will be installed in the appropriate manual page directory. See `fdformat(1)`, `add_drv(1M)`, `drvconfig(1M)`, `dkio(7)`, and `pcfs(7)`.

For a complete list of the contents of the PC Card Driver Update diskette, see the `README` files that are installed in the patch directories `/var/sadm/patch/`<*patch number*>, where <*patch number*> is one of the following for Solaris 2.4 x86 Driver Update 10 PC Card support: `101908-05`, `101924-02`, and `101938-01`.

Understanding PC Card Devices

A PC Card adapter may be built into your computer (as on most notebooks) or it may be an add-on card. Most have either one or two sockets, and the PC Card adapter is, itself, a device on another bus (usually ISA). The PC Card adapter manages the PC Card bus and maps PC Card devices onto the main bus (for example, ISA).

The PC Card bus was originally developed for memory cards and notebook computers. It is now used for a wide variety of devices (including modems, network interfaces, disk drives, SCSI HBAs, audio cards, and graphics cards) on machines of all sizes and architectures. See "Using PCMCIA Cards" in Appendix G of *Solaris User's Guide* for further information.

In the Solaris operating environment, sockets are numbered, starting with zero; whether they are numbered top-to-bottom or bottom-to-top is platform-dependent. Though sometimes marked as "1/2" or "A/B," usually sockets are not marked. To find out how sockets are numbered, either consult the hardware documentation or insert a card and see which device was created.

Three types of PC Card device are supported by Solaris device drivers. They are about the size of credit cards, but have different thicknesses:

- Type I: 3.3 mm
- Type II: 5 mm
- Type III: 10.5 mm

Lower-type cards can be used in higher-type sockets. For example, an adapter with Type-III PC Card sockets should be able to support Type-III, Type-II, and Type-I cards. But an adapter with Type-I sockets will only support Type-I devices.

PC Card devices are autoconfigured; that is, I/O ports and IRQs are assigned automatically by the Solaris system when each device is plugged in.

PC Card devices are hot-pluggable—they can be safely inserted and removed while a machine is running.

Configuring PC Card Devices

The PC Card software should automatically recognize any supported PC Card device when it is plugged in and then load the appropriate device driver. If you have a device that is compatible with a supported device, but it is not included in the supported devices database, `/etc/driver_aliases`, you can manually add your new card to the list.

This manual process applies to modem cards and is described in "Identifying an Unrecognized Device" in the "Modem and Serial PC Card Devices" Device Reference Page in Appendix A. You may also have to define aliases for a small percentage of SRAM cards that have "Attribute Memory."

Configuring the PC Card Adapter

While PC Card devices are autoconfigured, it may be necessary to perform some configuration for the PC Card adapter itself. The `pcmcia` nexus driver must know which resources are already allocated in order to assign IRQs and ports to PC Card devices. During the installation process, a script attempts to automatically determine which resources are already allocated on the system. Some systems may require that resource allocation information be provided manually. See "PC Card Adapters" in Appendix A.

Hot-Plugging PC Card Devices

Hot-plugging a PC Card device means that a PC card can be inserted or removed at any time, even while the machine is powered on and the Solaris software is running. Since this isn't the usual procedure for adding and removing devices, the following sections explain hot-plugging procedures.

Inserting Cards

A PC Card device can be inserted at any time into any empty PC Card socket. If there is driver support for the card, the card is recognized and a device node is created. When the `/usr/lib/pcmciad` daemon is running (which is by default), the driver is also loaded and the `/dev` entries for the device are created as appropriate.

The name of the /dev entry is often based on the name of the device driver and usually encodes the socket number where the card was inserted. For example, the entry for the 3Com 3C589 inserted in socket 0 will be /dev/pcelx0. The Device Reference Pages in Appendix A and the PC Card driver manual pages describe the /dev entries for each device driver.

Recognizing Cards

A PC Card device is "recognized" when it is inserted and the appropriate /devices and /dev entries are created. If you are not sure if your card has been recognized, perform the following checks:

- Run the prtconf command; the output should list the pcmcia, pcic, and the driver name for the card you inserted.
- Check to see that the/devices/pcmcia directory includes devices in one of these forms: driver@socket or driver@socket:driver. Since these are specific to each device driver, consult the Device Reference Pages in Appendix A.
- Check that the /dev directory includes the pcmcia device entry. Entries for the network device are also under /dev. Other entries appear in subdirectories of /dev; see the Device Reference Pages in Appendix A for each driver.

Identifying Unrecognized Cards

A PC Card device is "unrecognized" if the prtconf command doesn't show a correct entry for the device and if /devices and /dev entries don't exist. Two symptoms you might see for an unrecognized card are:

- An entry under pcmcia in the prtconf output is not a device driver name and says "(driver not attached)."
- An erroneous pcmem device is detected when the card inserted is a non-memory card.

A card is not recognized if it doesn't implement the full Card Information Structure (CIS) or there is a memory conflict.

- If you see "(`driver not attached`)", you can add a new alias to `/etc/driver_aliases` by using the `/add_drv` command. See the instructions in "Modem and Serial PC Card Devices" in Appendix A, only if the "model" property is also defined.
- If you see an erroneous `pcmem` entry appear, follow the instructions under "Correcting Possible Conflicts" in the "PC Card Adapters" Device Reference Page in Appendix A, or see "Troubleshooting PC Card Devices" later in this chapter.

Removing Cards

PC Card devices can be removed at any time. The framework notifies the PC Card device driver that the card has been removed. Each driver will then deal with the unplugged card in its own way. See "3Com EtherLink III (3C589) PC Card," "Modem and Serial PC Card Devices," and "SRAM and DRAM PC Card Devices" in Appendix A, "Device Reference Pages."

Installing the PC Card Driver Update

Note – Before installing this PC Card Driver Update, read the PC Card Device Reference Pages in Appendix A for specific information on devices. Also be sure that you have filled out the Device Configuration Worksheet and check that all hardware resources for your system are accounted for. Then if you have trouble identifying PC Card devices, you can consult the worksheet to see what possible device conflicts exist.

The contents of the "Solaris 2.4 x86 Driver Update 10 PCMCIA Diskette" is installed as a combination of patches and packages on your Solaris 2.4 x86 system.

Note – If you have an add-on PC Card adapter, be sure to install it before installing the PC Card Driver Update.

Note – If you are using a notebook computer with a docking bay, be sure the notebook is in the docking bay before you install the PC Card Driver Update. This is necessary so that the system can identify the resources used by cards in the docking bay.

1. **Insert "Solaris 2.4 x86 Driver Update 10 PCMCIA Diskette" into drive 0.**

2. **Become root.**

3. **Use `cpio` to copy files off the diskette, and run the installation script.**
   The following commands assume the Solaris Volume Management software is running on your system. If it isn't, `volcheck` should *not* be run, and the device name of the diskette drive must be replaced with `/dev/diskette0`.

To see if Volume Management software is running, type:
`ps -e | fgrep vold`
For more information about managing diskettes and drives, see *Solaris 2.4 Open Issues and Late-Breaking News*.

```
# mkdir /tmp/Drivers
# cd /tmp/Drivers
# volcheck &
# cpio -iduBI /vol/dev/aliases/dev/diskette0

Please remove the diskette from drive zero.
Press <ENTER> when ready.
```

4. **Remove the diskette from drive 0, and type the following:**

```
# ./installdu.sh
```

5. **Perform a reconfiguration boot to enable the new PC Card support.**

```
# touch /reconfigure
# reboot
```

I/O ports, IRQs, and memory addresses available for use by PC Card devices should be configured automatically. For information about manual configuration of PC Card devices, see "PC Card Adapters" in Appendix A, "Device Reference Pages."

If you insert a PC Card device into your system, it should be automatically recognized and configured. For more information, see the “Hot-Plugging” sections on the individual PC Card Device Reference Pages in Appendix A.

If you have a 3Com Ethernet PC Card, follow the additional installation instructions in the next section to enable the new network interface.

Note – Reconfigure boots or use of the `drvconfig` command should not be necessary with PC Card devices. Any use of these features will cause the `/kernel/drv/pcic.conf` file to be overwritten, so changes to the `smi` property will be lost (`#exclude:` lines will remain intact). These features should only be used when non-PC Card devices are added or removed.

Using PC Card Memory Cards

PC Card memory cards can be used like diskettes. They can be used to store data, or they can have file systems containing files and directories.

PC Card memory devices don’t need to have file systems on them, though typically, before using a new PC Card memory card, you will want to create a file system on it. DOS `pcfs` is a good format to use. Although you can use virtually any file system format on a PC Card memory card, most other file system formats are platform-dependent, making them unsuitable for moving data between different types of machines.

Note – If you want to redirect the output of a `tar` command (or `dd` or `cpio`) to a PC Card memory device, you *must* first create a file system on the card, using the `fdformat` command without arguments. The card will need to be reformatted before it can be written on again.

The method for creating a file system is different depending on whether or not the Solaris Volume Management software is used. Both methods are described below.

Using PC Card Devices Without Volume Manager

1. **Become root.**

2. **If you do not want to use `vold` to manage your PC Card memory cards, comment out the `use pcmem` line in the `/etc/vold.conf` file.**
   To comment out a line in `/etc/vold.conf`, add a # character to the beginning of the line using a text editor. The line would then look similar to the following:

```
# use pcmem drive /dev/rdsk/c*s2 dev_pcmem.so pcmem%d forceload=true
```

3. **Stop and restart Volume Manager so the change will take effect.**

```
# /etc/init.d/volmgt stop
# /etc/init.d/volmgt start
```

4. **Use the `fdformat` command to create a `pcfs` file system on the PC Card memory card.**

Note – `fdformat` will destroy all existing data on the memory card.

Device naming for PC Card memory cards is discussed in `pcram(7)`, `fdformat(1)`, and “SRAM and DRAM PC Card Devices” in Appendix A, “Device Reference Pages.”

For example, a DOS `pcfs` file system can be created on a PC Card memory card in socket 0 by typing:

```
# fdformat -t dos /dev/dsk/c1t6d0s2
```

5. **Use the `mount` command to mount the device.**
   For example, to mount the `pcfs` file system created in the previous step, on to the mount point `/mnt`, type:

```
# /etc/mount -F pcfs /dev/dsk/c1t6d0s2 /mnt
```

Using Volume Manager With PC Card Memory Cards

Since the Solaris Volume Management software recognizes PC Card memory cards, no special `vold` configuration is required.

1. **Become root.**

2. **Use the** `fdformat` **command to create a** `pcfs` **file system on the PC Card memory card. See** `fdformat(1)`**.**
   For example, a DOS `pcfs` file system can be created on a PC Card memory card in socket 0 by typing:

```
# fdformat -t dos /vol/dev/aliases/pcmem0
```

3. **After formatting is complete, Volume Manager will automatically mount the device only *after* the card is physically removed and reinserted. To check this, run the** `mount` **command after reinserting the card.**

Troubleshooting PC Card Devices

When a PC Card device doesn't work, you must isolate the problem.

First, determine that the nexus and adapter drivers have loaded successfully:

- Use the `prtconf` command to see if the device nodes for both `pcic` and `pcmcia` exist.
  - If they do, the software has loaded and successfully identified a PC Card adapter. Any card that is inserted should be identified as an entry under the `pcmcia` node. If it is a supported card, then it should be usable when inserted and the `prtconf` output identifies the card. It should not say "`(driver not attached)`" or be falsely identified as a `pcmem` card. See "Identifying Unrecognized Cards" earlier in this chapter.
  - If neither device driver is recognized, your system does not have a supported PC Card adapter.

If a PC Card device is recognized as present when the card is in the socket before the system is booted, but is not recognized as present when the card is hot-plugged, do the following:

- If you have an AST PowerExec notebook computer:
  - Remove IRQ 15 from the list of usable interrupts.
  - Define the `smi` property to be 9.

  See "PC Card Resource Configuration Information" in the Device Reference Page for "PC Card Adapters" in Appendix A for instructions.

- If your notebook computer is not an AST PowerExec, try overriding the default interrupt by using the `smi` property as described in “PC Card Adapters” in Appendix A. If that does not work, try several different IRQ levels.

If a PC Card device is not identified when inserted prior to booting the system, do the following:

- Make sure that the I/O, memory, and interrupt resources listed in the `/kernel/drv/pcic.conf` file are correct. These properties are described in the “PC Card Adapters” Device Reference Page under “PC Card Resource Configuration Information.” If the information there is accurate, contact your technical support provider.

The Intergraph TD-30 and TD-40 machines exhibit PC Card memory conflicts which can be corrected by adding one set of the following two lines to the `/kernel/drv/pcic.conf` file and then rebooting the system.

```
#exclude:td30 res-memory c0000 10000
#exclude:td30 res-memory d0000 40000
or
#exclude:td40 res-memory c0000 10000
#exclude:td40 res-memory d0000 40000
```

Device Reference Pages A

This appendix supplements Appendix B, "Device Reference Pages," in *x86 Device Configuration Guide*. It includes necessary device configuration information for hardware supported by the new or updated drivers.

Use the following table to locate information about your hardware and proceed directly to those pages.

IDE Interface	**Solaris Driver**	
IDE Disk Drive and Enhanced IDE Controller (Including IDE CD-ROM ATAPI)	`ata`	*page 36*
SCSI Host Bus Adapters	**Solaris Driver**	
Adaptec AHA-154x ISA HBAs	`aha`	*page 39*
Adaptec AIC-6360/AHA-1522A/AHA-1520A/AHA-1510A/ AHA-1530P/1532P HBAs	`aic`	*page 41*
Sound Blaster 16 SCSI-2 (SCSI)	`aic`	*page 41*
Adaptec AIC-7770/AHA-274x/AHA-284x HBAs	`esa`	*page 46*
Adaptec AIC-7850/AIC-7870/AIC-7871/AIC-7872/ AIC-7880 (AHA-2940/AHA-2940W/AHA-2940U/ AHA-2940UW/AHA-3940/AHA-3940W PCI HBAs)	`adp`	*page 51*
AMD PCscsi, PCscsi II, PCnet-SCSI PCI HBAs	`pcscsi`	*page 54*
BusLogic SCSI HBAs	`blogic`	*page 55*
Compaq 53C710, 53C810, 53C825 PCI and EISA SCSI-2 HBAs	`ncrs`	*page 61*
DPT PM-2011/PM-2021 ISA HBAs	`dpt`	*page 63*

DPT PM-2012B EISA HBA	`dpt`	*page 65*
DPT PM-2022/PM-2122/PM-3222 EISA HBAs	`dpt`	*page 67*
IBM Micro Channel SCSI-2 Fast/Wide Adapter/A	`corvette`	*page 70*
NCR 53C710 HBAs (Siemens Nixdorf PCE-5S SCSI)	`ncrs`	*page 74*
NCR 53C8xx PCI SCSI HBAs (53C810, 53C815, 53C820, 53C825)	`ncrs`	*page 75*
Trantor T348 MiniSCSI Plus Parallel HBA	`trantor`	*page 77*
Tricord Systems Intelligent SCSI Subsystem (ISS) HBAs	`iss`	*page 79*
SCSI Disk Arrays/RAID Controllers	**Solaris Driver**	
Compaq SMART SCSI Array Controller	`csa`	*page 80*
DPT PM-2024/PM-2124/PM-2124W/PM-3224/PM-3224W PCI HBAs	`dpt`	*page 81*
IBM DMC960 RAID Micro Channel HBAs (IBM SCSI-2 RAID, IBM SCSI-2 Fast/Wide Streaming-RAID Adapter/A)	`mlx`	*page 83*
Mylex DAC960P PCI Controller	`mlx`	*page 85*
Other SCSI Devices	**Solaris Driver**	
SCSI Tape Drives	`st`	*page 87*
Ethernet Network Adapters	**Solaris Driver**	
3Com EtherLink 16 (3C507)	`elink`	*page 89*
3Com EtherLink III (3C5x9, 3C509B)	`elx`	*page 90*
AMD PCnet Ethernet (PCnet-ISA, PCnet-PCI)	`pcn`	*page 91*
Compaq NetFlex-2 DualPort ENET, NetFlex-2 ENET-TR EISA Controllers	`nfe`	*page 94*
DEC 21040, 21041, 21140 Ethernet	`dnet`	*page 96*
Intel EtherExpress 16, 16C, 16TP, MCA, MCA TP	`iee`	*page 99*
Intel EtherExpress PRO	`eepro`	*page 101*
Intel EtherExpress PRO/100 (82556)	`ieef`	*page 102*
Novell NE2000, NE2000plus Ethernet and Clones	`nei`	*page 105*
Novell NE3200 EISA Ethernet	`nee`	*page 111*
Racal InterLan ES3210/ES3210 TP EISA Ethernet	`riles`	*page 113*
SMC Elite32 Ultra (8232)	`smceu`	*page 115*
SMC Ether 10/100 (9232)	`smcf`	*page 117*
SMC EtherEZ, EtherCard Elite16 Ultra, EtherCard PLUS Elite16, EtherCard PLUS (8416, 8216, 8013, 8003)	`smc`	*page 118*

FDDI Network Adapters	**Solaris Driver**	
Cabletron FDDI F70xx	`cbtnf`	*page 121*
Audio Cards	**Solaris Driver**	
Sound Blaster Pro	`sbpro`	*page 123*
Sound Blaster 16/Sound Blaster AWE32	`sbpro`	*page 126*
PC Card Hardware	**Solaris Driver**	
PC Card Adapters	`pcic`	*page 130*
3Com EtherLink III (3C589) PC Card	`pcelx`	*page 136*
Modem and Serial PC Card Devices	`pcser`	*page 139*
SRAM and DRAM PC Card Devices	`pcram`	*page 142*

IDE Interface

IDE Disk Drive and Enhanced IDE Controller (Including IDE CD-ROM ATAPI)

Description

An IDE disk drive contains a disk controller and drive electronics. An IDE controller supports two devices per controller up to a maximum of four IDE drives when both primary and secondary interfaces are available. This includes hard disk drives and CD-ROM drives.

Device Configuration

Preparing for Configuration

If you have two IDE drives on the same adapter, one must be set to “master” and the other to “slave.” Typically, if you have both an IDE hard disk drive and an IDE CD-ROM drive, the CD-ROM drive is the slave, and the hard disk drive is the master, but this is not required. If you only have one drive on an adapter, it must be set to master.

Configuring the Device

1. **If you have an IDE CD-ROM drive installed, the system BIOS “Drive Type” parameters should be set to “`not installed`” for that device, since they only apply to IDE hard disks.**

2. **Enable BIOS support for enhanced IDE drives, if your system supports it.** Typically, this capability is referred to as Logical Block Addressing (LBA).

Note – If the BIOS supports autoconfiguration, use this facility to set the number of heads, cylinders, and sectors for the IDE hard disk drive. If this capability is not supported by the BIOS, then use the settings provided by the disk manufacturer.

---

3. **Verify that the configuration recorded on your Device Configuration Worksheet for your IDE adapter is set within the parameters listed under "Valid Configurations" below.**

Valid Configurations

Following are the IDE adapter parameter ranges:

Primary controller:

• IRQ	14
• I/O Address	0x1F0

Secondary controller:

• IRQ	15
• I/O Address	0x170

Known Problems and Limitations

- **(1191272)** Several vendors ship PCI-equipped machines with IDE interfaces attached to the system board directly. A number of these machines use the PCI to IDE chip set designed by the CMD (part number 06040.) This chip provides two IDE interfaces. The primary IDE controller is at I/O address 0x1f0 and the secondary controller at 0x170. However this chip can not handle simultanous I/O on both IDE controllers. This defect causes Solaris to hang if both interfaces are used. The workaround for this problem is to use only the primary IDE controller at address 0x1f0. Machines known to use this chip include DELL® XPS/90, HP XU/590C and American Megatrends Atlas boards.

- **(1191294)** In this release, it is not possible to boot from the third or fourth IDE disk drives, although you can install Solaris software on them.

- The Solaris Volume Management software does not fully support the IDE CD-ROM interface if the drive is configured as the slave. For example, the `vold` program does not always automatically mount CDs that are installed in the slave drive after booting (as it does for SCSI drives), and the '`eject cdrom`' command will not work.
  Workaround: The Solaris Volume Management software supports CD-ROM interface if the drive is configured as the master. You can still access the IDE CD-ROM drive that is configured as the slave manually by specifying the device name when invoking commands as user root. For example:

```
# mount -F hsfs -r /dev/dsk/c0d1p0 /mnt
```

- **(1192383)** The Solaris Volume Management software does not work with the Sony CDU-55E CD-ROM drive regardless of how it is configured (as the master or the slave). This problem can be fixed by installing `vold` patch `101908-07`.
- **(1189664)** The Panasonic LK_MC579B IDE CD-ROM drive cannot be used to install the Solaris operating environment and is not supported.
- The following ATAPI CD-ROM drives may fail during installation on some configurations:
    - NEC CDR-260
    - NEC CDR-260R
    - NEC CDR-273
    - AZT CDR 268-031SE
    - Media Vision 6X
    - Sony CDU-55E

SCSI Host Bus Adapters

Adaptec AHA-154*x* ISA HBAs

Description

The Adaptec AHA-154*x* family of 16-bit SCSI host bus adapters is used with ISA or EISA buses.

Device Configuration

Preparing for Configuration

- Use default configuration parameters in both basic and advanced modes for the Adaptec AHA-1540C, AHA-1542C, and AHA-154*x*CP.
- To access the AHA-154*x* C/CF or AHA-1540*x*CP BIOS setup utility Configuration screen, press ctrl+A.
- Select SCSI Device Configuration and disable Synchronous Negotiation for each CD-ROM drives target.
- Return to the Configuration screen and select Advanced Configuration Options and do the following:
  - Disable the option that supports greater than 1 Gbyte (1024 cylinders) on the disk (Extended BIOS Translation for DOS Drives > 1 Gbyte).
  - Disable the option that supports more than two DOS drives.
  - Disable the Dynamically Scan SCSI Bus for BIOS Devices option. (For the AHA-1540C/CF, this option is disabled by default. When configuring an AHA-154*x*CP, you must disable this option.)
- The DMA transfer rate for the AHA-1540CF should be left at the default unless your motherboard supports higher rates.

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if the Adaptec AHA-154*x* settings need to be changed.**

2. **Refer to the Adaptec manual for how to set the jumpers or DIP switches to the parameters that appear on your worksheet.**
   Note that the AHA-1540C, AHA-1542CF, and AHA-154*x*CP contain a built-in, menu-driven program for configuring HBA options. (A DIP switch replaces many of the jumpers found on the B version.) Use of the built-in configuration program and DIP switch assignments are documented in the installation guide that comes with the Adaptec AHA-154*x*C or AHA-154*x*CP board.

3. **If necessary, modify the parameter values.**

Valid Configurations

Following are the parameters for Adaptec AHA-154*x* host bus adapters:

• IRQ	Any legal value between 9 and 15
• DMA Channel	6
• I/O Address	0x330

Alternative Custom Configuration

The DMA speed, bus on time, and bus off time may be set for optimum performance with each ISA motherboard. Refer to *Adaptec AHA-1540/1542 User's Manual* for instructions.

Adaptec AIC-6360/AHA-1522A/AHA-1520A/AHA-1510A/ AHA-1530P/1532P HBAs

Sound Blaster 16 SCSI-2 (SCSI)

Description

The Adaptec AHA-1522A, AHA-1520A, AHA-1510A, and AHA-1530P/1532P SCSI host bus adapters are used with an ISA bus. The AHA-1510A, AHA-1520A, and AHA-1530P provide an interface between the computer's system bus and a SCSI bus. The AHA-1522A and AHA-1532P provide diskette drive support as well. All are based on the Adaptec AIC-6360 SCSI controller chip.

The SCSI-2 interface of this audio card uses the AIC-6360 chip. The Sound Blaster 16 SCSI-2 adapter is a 16-bit ISA card that provides audio functions and a SCSI-2 interface.

Note – Neither the Adaptec AHA-1510A adapter nor the SCSI interface on the Sound Blaster 16 SCSI-2 audio card can be used as a primary (boot) disk controller since they have no BIOS. The system must be booted from a disk attached to another controller.

Device Configuration

Preparing for Configuration

Note – The `aic` device driver is used to drive *only* the SCSI controller on these cards. The audio portion of the Sound Blaster 16 SCSI-2 requires a separate Solaris device driver (`sbpro`) for operation.

- The SCSI subsystem of the Sound Blaster 16 SCSI-2 needs its own I/O (port) address and an IRQ, distinct from those of the audio subsystem.
- To use the AHA-1520A and AHA-1522A, you must configure the BIOS base address, the I/O (port) address, and the IRQ on the controller. The AHA-1510A only needs an I/O (port) address and an IRQ.

- To use the AHA-1530P and AHA-1532P, you must configure the BIOS base address, the I/O (port) address, and the IRQ on the controller using the on-board utility. (Press Ctrl-A to enter the on-board utility at boot time.)
- Refer to the documentation that comes with the Adaptec adapter or Sound Blaster 16 SCSI-2 adapter to find out what settings each device supports.
- See "Valid Configurations" for address and IRQ settings that the Solaris `aic` driver supports.
- Configure and terminate the SCSI bus correctly to prevent problems.

Note – The Sound Blaster 16 SCSI-2 will never need to have its terminating resistors removed (and they are not removable).

- The AHA-1522A, AHA-1520A, AHA-1530P, and the AHA-1532P support booting from disks with over 1 gigabyte. On the AHA-1530P and AHA-1532P, use the on-board utility (entered via Ctrl-A at boot time) to enable this option under the "Advanced Features" menu. On the AHA-1522A and AHA-1520A, add a jumper to pin 0 (rightmost pin) of jumper block J5.

Avoiding Possible Conflicts

- ISA cards can be used in EISA slots but not vice versa. If you are using the device in an EISA slot, obtain the appropriate EISA configuration file from the device manufacturer. Using the EISA configuration utility, select settings for the device. Be sure to "lock" the settings in the EISA configuration utility so the software does not try to *change* the device settings. The EISA configuration program needs to know about the ISA device, so it doesn't set up an EISA card using the ISA card settings.
- The Adaptec AHA-1510A host bus adapter and the Sound Blaster 16 SCSI-2 SCSI interface can be run *only* on IRQ 11. Because of this requirement, only one AHA-1510A or Sound Blaster 16 SCSI-2 controller can be installed in a system.

Configuring the Device

Note – Set the jumpers for the SCSI interface and not for the audio.

---

1. **Set the I/O address jumper to select the desired value.**

2. **For 1520A, 1522A, 1530P, and 1532P *only*: Set the IRQ jumper to select the desired value.**

3. **For 1520A, 1522A, 1530P, and 1532P *only*: Set the BIOS base memory address jumpers to select the desired value.**

4. **For AHA-1520A, AHA-1522A, AHA-1530P, and AHA-1532P *only*: If necessary, enable support for disks greater than 1 Gbyte.**
   On the AHA-1530P and AHA-1532P, use the on-board utility (press Ctrl-A at boot time) to select this option under the Advanced Features menu. On the AHA-1522A and AHA-1520A, this option is set by adding a jumper to pin 0 (the rightmost pin) of jumper block J5.

5. **For AHA-1510A, AHA-1520A, and AHA-1522A *only*: If necessary for your SCSI configuration, remove the three terminating resistors from the controller.**

6. **For the AHA-1530P and AHA-1532P *only*: Termination is set using the on-board utility.**

7. **For the Sound Blaster 16 SCSI-2 *only*: Disable any DMA channel that may be selected.**

Valid Configurations

Following are the parameters for these SCSI-2 interfaces:

Adaptec AIC-6360:

• IRQ	9, 10, 11, 12
• I/O Address	0x140, 0x340

Adaptec AHA-1510A:

• IRQ	11
• I/O Address	0x140, 0x340

Note – For booting, the I/O address on the AHA-1520A and AHA-1522A can be set to 0x140 only with a special BIOS available from Adaptec.

Adaptec AHA-1520A, 1522A:

• IRQ	9, 10, 11, 12
• I/O Address	0x140, 0x340
• BIOS Base Address	0xDC000, 0xD8000, 0xCC000, 0xC8000

Adaptec AHA-1530P, 1532P:

• IRQ	9, 10, 11, 12
• I/O Address	0x140, 0x340
• BIOS Base Address	0xDC000, 0xD8000, 0xD4000, 0xD0000, 0xCC000, 0xC8000

Sound Blaster 16 SCSI-2:

• IRQ	11
• I/O Address	0x140, 0x340
• DMA Channel	(Not used)

- Adaptec 152*x* devices *only*: The BIOS base address can be any available value. The default is 0xDC000.
- Sound Blaster 16 SCSI-2 *only*: No DMA channel should be selected. The driver does not support DMA.
- All other settings should be set to the default factory settings (unless changes are necessary to avoid conflicts).

Note – Neither the Adaptec AHA-1510A adapter nor the SCSI interface on the Sound Blaster 16 SCSI-2 audio card can be used as a primary (boot) disk controller (as they have no BIOS). Thus, the system will have to boot from a disk attached to another controller.

Alternative Custom Configuration

- If you have a second SCSI controller, ensure that the two devices are not configured to the same IRQ, I/O address, or memory (BIOS) address.
- If a system has two or more disk controllers and hard disks on both controllers, be sure you understand which disk you have selected for installation, and ensure that the disk you select is the one your computer will boot from when you reset the system. See Chapter 5, “Common Problems,” in *x86 Device Configuration Guide* for information on how Solaris assigns controllers during initial installation.

Known Problems and Limitations

Long cables, multiple external devices, or both can cause random bus hangs under heavy loads in configurations with Adaptec devices. The SCSI specification defines the maximum length of the SCSI bus, including all cables, to be 6 meters (19.6 feet). Use shorter cables or fewer external devices to avoid problems.

Adaptec AIC-7770/AHA-274*x*/AHA-284*x* HBAs

Description

These configuration notes apply to the Adaptec AHA-2740/2742, AHA-2740A/2742A, AHA-2740T/2742T, AHA-2740W, and AHA-2740AT/2742AT EISA host bus adapters, AHA-2840VL and AHA-2842VL VESA local bus host bus adapters, and motherboards that integrate the Adaptec AIC-7770 chip such as the Intel Xpress and the Unisys U6000 server systems.

Caution – Probing for AHA-284*x* VLB cards has been disabled to avoid conflicts with some PCI devices. To enable your AHA-284*x* adapter, see "Adding Support for AHA-284x Devices" later on this Device Reference Page.

Device Configuration

Preparing for Configuration

- Ensure that the SCSI bus is properly terminated.
- Make sure that the CD-ROM drive with the Solaris CD is on channel A of the boot controller and that the boot disk is target 0 on channel A of the same controller.
- Configure AHA-2740 boards with up-to-date configuration files to make sure they are properly recognized. Use Version 2.1 or later of the AHA-2740 series configuration utilities.
- On a motherboard with an AMI BIOS, use Version 2.01 or later of the AMI EISA configuration utility when configuring the AHA-2740 EISA.
- For disks larger than 1 Gbyte, enable BIOS support for large disks. The HBA geometry for large disks is 255 heads and 63 sectors per track; for smaller disks it is 64 heads, 32 sectors per track.
- For a slow CD-ROM device, such as the Sun™ Sony CD-ROM or the Unisys system CD-ROM, disable the Bus Reset option on channel A of the boot controller. Use the EISA configuration utility on the AHA-274*x*, or use the configuration utility for the AHA-284*x* by pressing Ctrl-A at boot time. After installation, enable the Bus Reset option again.

Avoiding Possible Device Conflicts

- Probing for AHA-284*x* VLB cards has been disabled to avoid conficts with some PCI cards at certain I/O addresses.
- Motherboards that support level-triggered interrupts, such as an EISA motherboard, will support multiple 2740 adapters sharing the same IRQ (although there may be minor performance degradation).
- The AHA-2840VL adapter cannot share IRQ vectors because it supports only Edge-triggered interrupts.

Note – The AHA-2740 is not compatible with Wyse MP systems.

Adding Support for AHA-284x Devices

- If you are installing Solaris using Driver Update 10 on a system with an AHA-284*x* controller, you need to modify the Driver Update 10 Boot diskettes before installation. See “Modifying the Driver Update 10 Boot Diskettes.”
- If you are adding Driver Update 10 on a system with a AHA-284*x* controller that already has Solaris installed, you must modify the `/etc/system` file so that the AHA-284*x* controller is recognized. This should be done after installing Driver Update 10, but before rebooting. Add the following line to the `/etc/system` file:

```
set esa:esa_vlb_probe = 0xffff
```

- If you are adding an AHA-284*x* controller to a system that has Solaris x86 and Driver Update 10 installed, you must do the following before installing the controller:

   a. **Add the following line to the** `/etc/system` **file.**

```
set esa:esa_vlb_probe = 0xffff
```

b. Do the following:.

```
# touch/reconfigure
# halt
```

c. Power down the system, install the controller, and power up the system.

Modifying the Driver Update 10 Boot Diskettes

Since probing for AHA-284*x* VLB cards has been disabled by default, special command files on the boot diskettes are used to enable probing. The diskettes must be modified using DOS. As a precaution, you should make a copy of the original Boot diskettes prior to running the special command files.

1. **Boot DOS on your system.**
2. **Insert a blank 3.5-inch diskette into drive A: and format it:**
   `format a:`
3. **Insert "Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   `diskcopy a: a:`
4. **Label the copy of the first Boot diskette as "Modified**."
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette for AHA-284*x* SCSI controller."
5. **Insert another blank 3.5-inch diskette into drive A: and format it:**
   `format a:`
6. **Insert "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   `diskcopy a: a:`
7. **Label the copy of the second Boot diskette as "Modified."**
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette for AHA-284*x* SCSI controller."
8. **Store your original Boot diskettes in a safe place.**

9. **Insert the copy of "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into drive A:.**
   Make sure the diskette is writable because the contents will be modified.

10. **Change to drive A: (remember DOS is still running):**
    `a:`

11. **To enable AHA-284*x* probing, run the** `esavlb.bat` **command:**
    `esavlb`

Configuring the Device

1. **Run the configuration utility supplied by the vendor, and load the configuration file for the Adaptec controller.**

2. **Choose any valid IRQ that does not conflict with other devices in the system.**

3. **Select channel A as the Primary Channel.**

4. **Run the BIOS configuration and verify that BIOS support for more than two drives is disabled.**

5. **If there are multiple 7770 controllers on one system, the order of the I/O base addresses must match the order of the BIOS base addresses.**
   On an EISA motherboard, the I/O base address corresponds to the EISA slot number times 0x1000 plus 0xc00 for controller boards. For example, if the first slot has a 2740 controller, the address is 0x1c00, and if the adjacent slot also has a 2740 controller, the address is 0x2c00. Motherboard vendors usually map the controller chip on the motherboard at the highest EISA slot plus 1. Thus in an EISA motherboard with three EISA slots, the motherboard 7770 address is 0x4c00.

   The BIOS base address is selected from a range of possible choices on the vendor-supplied configuration utility. Common addresses for the 2740 controller are: 0xcc00, 0xd400, 0xd800, and 0xdc00. The controller with the lowest BIOS base address will become the boot or primary controller.

   Solaris numbers controllers using the I/O base address. To ensure that the boot controller for the BIOS is identified as the boot controller by Solaris, order the BIOS base addresses in the same manner as I/O base addresses.

Known Problems and Limitations

- A large disk used with Solaris on a 7770 controller cannot be mounted on a controller with a different geometry, such as the DPT PM-2022 controller.
- Some VESA local bus motherboards do not support more than one bus master controller like the AHA-2840 VESA local host bus adapter.
- Disks larger than 1 Gbyte are supported with two different geometries depending on whether the disk is on a controller with the BIOS enabled or disabled at run time.

  The boot controller must always have the BIOS enabled. After two disks have been located on one or two controllers, the BIOS is automatically disabled on all subsequent 2740 controllers.

  The geometry for a disk with BIOS enabled in the EISA configuration utility at run time where the system has not disabled the BIOS is 255 heads and 63 sectors per track.

  For all other disks, the geometry is 64 heads and 32 sectors per track.

  A disk on a 2740 controller configured with the BIOS enabled cannot be moved to a controller with the BIOS disabled and still have 255 heads and 63 sectors per track.
- On the Unisys U6000/DT2, run the UNISYS.BAT file in a DOS environment before installation. Refer to *Solaris 2.4 Open Issues and Late-Breaking News* for more information.

Adaptec AIC-7850/AIC-7870/AIC-7871/AIC-7872/AIC-7880 (AHA-2940/ AHA-2940W/AHA-2940U/AHA-2940UW/AHA-3940/AHA-3940W PCI HBAs)

Description

The Adaptec AHA-2940, AHA-2940W, AHA-2940U, AHA-2940UW, AHA-3940, and AHA-3940W cards are PCI-to-Fast SCSI controllers based on the Adaptec AIC-7850, AIC-7870, AIC-7871, AIC-7872, or AIC-7880 chips.

Device Configuration

Preparing for Configuration

- To avoid user-level program core dumps on heavily loaded systems, install patch ID 101946. See "Solaris 2.4 x86 Jumbo Kernel Patch" in Chapter 1 for information on how to obtain this patch.
- To use the AHA-3940 or AHA-3940W adapters, the motherboard must have a BIOS that supports the DEC PCI bridge chips on the host bus adapter.

Configuring the Device

1. **Ensure that the SCSI bus is properly terminated.**
2. **Set up the IRQ for the controller by using the CMOS setup utility supplied with the motherboard (if this feature is available for your computer).**
   If you have more than one controller (or an embedded controller), use one IRQ per controller. Enable bus mastering for the slot(s) with your host bus adapter(s), when the choice is given.
3. **Run the Adaptec configuration utility by pressing Ctrl-A at boot time.**
4. **Ensure that support for more than two DOS drives is disabled.**
5. **For older drives, tapes, and most CD-ROM devices, make sure the maximum SCSI data transfer speed is set to 5.0 Mbytes per second.**
6. **Enable support for disks larger than 1 Gbyte if applicable.**

7. **Make sure there are no IRQ conflicts between ISA cards on your system and PCI controllers.**

Known Problems and Limitations

- QA testing uncovered a problem in the firmware used with the AHA-2940U, AHA-2940UW, and embedded HBAs that use the AIC-7880 controller chip (models of the Adaptec HBAs that use the AIC-7870 chip are not affected). This firmware problem may occasionally cause the SCSI bus to hang in a state from which it can not be recovered without doing a hard reset, potentially corrupting data on your disks. So far this problem has only occurred on test systems after several hours of very heavy I/O stress testing using multiple SCSI devices. Because of the serious nature of this problem, an updated `adp` driver will be provided as soon as this problem is fixed.
- The Adaptec AHA-3940 has been certified by Adaptec to run in specific system platforms. Our testing has shown that Solaris works properly in some of those systems and not in others. If you encounter problems running Solaris on an Adaptec-approved platform with the AHA-3940, contact your technical support provider.
- On some PCI systems with an Adaptec 294*x* card installed, user-level programs may core dump under heavy system load (such as during installation). The problem is *not* with the Adaptec hardware. However, if you have installed patch ID 101946, and you continue to see user-level programs dumping core, turn off write-back CPU caching (or all caching if there is no control over the caching algorithm) using the BIOS setup facility. This problem has been observed on a number of PCI motherboards, including the following:
  - PCI motherboards with a 60-MHz Pentium™ chip, with PCI chipset numbers S82433LX Z852 and S82434LX Z850. The part number of the Intel motherboard is AA616393-007.
  - PCI motherboards with a 90-MHz Pentium chip, with PCI chipset numbers S82433NX Z895, S82434NX Z895, and S82434NX Z896. The part number of the Intel motherboard is 541286-005. (Gateway 2000 uses this motherboard.)
  - PCI motherboards with a 66-MHz Pentium chip, with PCI chipset numbers 433LX Z852 and 434LX Z882. The motherboard part number is AA-619772-002. (Gateway 2000 uses this motherboard.)

- The Adaptec 2940 SCSI adapter does not recognize the Quantum Empire 1080S SCSI disk drive or the HP 3323 SE SCSI disk drive.
  Workaround: Reduce the Synchronous Transfer rate on the Adaptec controller to 8 Mbytes per second.
- The Adaptec AHA-2940U and AHA-2940UW adapters have been observed to hang system operation when SCSI tape I/O has errors, such as when the end of the tape is reached.Therefore, minimize use of tape drives on the AHA-2940U, AHA-2940UW, and machines with the AIC-7880 chip on the motherboard until the next release of this device driver.

AMD PCscsi, PCscsi II, PCnet-SCSI PCI HBAs

Description

The Solaris `pcscsi` driver supports the AMD PCscsi (Am53C974), PCscsi II (Am53C974A), and PCnet-SCSI (Am79C974) host bus adapters. These are all PCI devices. The PCnet-SCSI chip is currently embedded in the HP Vectra XU 5/90 and Compaq DeskPro XL 560 systems.

Only the SCSI portion of the PCnet-SCSI host bus adapter is discussed here. The net portion of the AMD PCnet-SCSI chip requires a separate Solaris driver (`pcnet`) for operation. See the "AMD PCnet Ethernet (PCnet-ISA, PCnet-PCI)" Device Reference Page for specific configuration information about the Ethernet capabilities.

Device Configuration

Preparing for Configuration

- See the manufacturer's documentation for setup and cabling requirements.
- Ensure the SCSI bus is properly terminated.

Configuring the Device

Use the motherboard CMOS or EISA setup utility to ensure that the controller is enabled, that the SCSI BIOS is enabled and does not conflict with locations used by another device, and that the IRQ settings do not conflict with another device.

Known Problems and Limitations

The SCSI Tagged Queuing option is not supported.

BusLogic SCSI HBAs

Description

The BusLogic SCSI host bus adapters are controllers for common disk, tape, and I/O subsystems.

The following models are supported:

Model	**Bus**
BT-742A, BT-746C, BT-747C, BT-747S, BT-757C, BT-757S	EISA
BT-542B, BT-545C, BT-545S	ISA
BT-440C, BT-445C, BT-445S	VESA
BT-946C, BT-956C	PCI

Device Configuration

Preparing for Configuration

- **For EISA, ISA, and VESA local bus models:** Set the I/O address to any valid BusLogic host bus adapter I/O address except 0x330 and 0x230. (The factory default is 0x330, so it must be changed.)
- **For PCI models:**
  - If your PCI card is model BT-946C *and* it is labeled Rev. A or B, it needs to be supported in ISA emulation mode; use I/O address 0x334.

Note – In order to determine the revision level of a BusLogic PCI card, you must look at the card itself. The revision of the card is not referenced in the documentation that comes with the card.

  - If your PCI card is model BT-946C *and* it is labeled Rev. C, it can be supported in native PCI mode. To do this, select “Advanced option,” and choose “NO” for the “Host Adapter I/O Port Address as default” option.

- If your PCI card is model BT-956C, or model BT-946C, Rev. E or later, it can also be supported in native PCI mode. To do this, disable the "Set ISA Compatible I/O Port (PCI Only)" option.

- If your BusLogic board model ends in "C", you must enter the AutoSCSI configuration utility and check the termination.

Configuring the Device

For EISA Models:

1. **Run the EISA configuration utility and change the factory-set I/O port address.**
   Do *not* use the default 0x330 I/O address.

2. **If a board has a model name ending with a "C", such as the BT-746C and the BT-747C, run the BusLogic AutoSCSI configuration utility.**
   To run the AutoSCSI utility, type Ctrl-B after you see the `BusLogic Utility Banner` on your screen.

   a. **Check termination.**

   b. **The Advanced option "**`BIOS Support for > 2 Drives (DOS 5.0 or above)`**" should be set to No.**

3. ***For model BT-757C only:* If the system has a narrow target, turn off the "wide negotiation option" when configuring devices.**

For ISA and VESA Local Bus Models:

1. **Set the I/O address and BIOS address with the dip switches.**
   Do *not* set the I/O address to 0x330.

2. **If a board has a model name ending with a "C", such as the BT-545C and the BT-445C, run the BusLogic AutoSCSI configuration utility to set the IRQ and check termination.**
   To run the AutoSCSI utility, type Ctrl-B after you see the `BusLogic Utility Banner`" on your screen.

   a. **Set the IRQ.**

   b. **Check termination.**

   c. **The Advanced option "**`BIOS Support for > 2 Drives (DOS 5.0 or above)`**" should be set to No.**

3. **Older ISA and VESA Local Bus models of BusLogic boards, such as the BT-545S, BT-542B, and BT-445S, must have their IRQ set in two places—with switches and jumpers.**
   The Host Interrupt Request switch and the Host Interrupt Channel jumper must have settings that match, or the board will not work.

For PCI Model BT-946C, Rev. A and B only:

This card must be updated in Set Compatible mode by doing the following:

1. **The BusLogic BT-946C (Rev. A or B) board should be put into the Bus Master slot.**

2. **Enter the AutoSCSI utility.**

3. **Select "Advanced option."**

4. **Set termination as needed.**

5. **If the boot disk is larger than 1 Gbyte, set the "**`Adapter BIOS Supports Space > 1 GB (DOS) only`**" option to Yes.**

6. **Set the adapter to ISA-compatible mode.**
   Set the value for "`Set Host Bus Adapter IO Port Address as Default`" to `No`.

7. **The Advanced option "**`BIOS Support for > 2 Drives (DOS 5.0 or above)`**" should be set to No.**

8. **Save the changes.**

9. **Reboot the system.**

10. **If your PCI motherboard is not fully PCI-specification compliant, you may have to manually configure the IRQ and BIOS address values. If the system hangs while installing the Solaris operating environment, do the following:**
    - Check the IRQ jumpers on the motherboard, if any.
    - Run the CMOS utility to set IRQ and BIOS address, if any.
    - Run the BusLogic AutoSCSI utility.

All the settings should match each other. On the BT-946C revision A or B adapter, the jumpers JP4 and JP5 are for configuring the BIOS address. If you need to manually configure the BIOS address, you may have to check these jumpers.

11. **If you still experience problems while installing the Solaris software, set the Interrupt Pin number of the "configure Adapter" option in the BusLogic AutoSCSI utility as follows:**

Slot	Interrupt Pin
0	A
1	B
2	C

For more information, see the "Configuration for Non-Conforming PCI Motherboards" and the "Handling Motherboard Variations" sections of the documentation that comes with your PCI BusLogic board.

For All Other PCI Models (Except BT-946C, Rev. A and B):

The Rev. C and above revision cards should be configured to operate in native PCI mode, not in ISA-compatible mode.

1. **The BusLogic PCI board should be put into the Bus Master slot.**
2. **Enter the AutoSCSI utility.**
3. **Set SCSI termination as needed.**
4. **Select "Advanced option."**
5. **If the boot disk is larger than 1 Gigabyte, set the** `Adapter BIOS supports space > 1 GB (DOS only)`**" option to Yes.**
6. **Choose the defaults except set the 5.1 "BIOS Support for > 2 Drives (DOS 5.0 or above)" to NO.**
7. **Save the changes.**
8. **Reboot the system.**

9. **If you experience problems while installing the Solaris software, set the Interrupt Pin number of the "configure Adapter" option in the BusLogic AutoSCSI utility as follows:**

Slot	Interrupt Pin
0	A
1	B
2	C

For more information, see the "Configuration for Non-Conforming PCI Motherboards" and the "Handling Motherboard Variations" sections of the documentation that comes with your PCI BusLogic board.

Valid Configurations

- ISA, EISA, and VLB adapters:
  - IRQ 9, 10, 11, 12, 14, 15
  - I/O Address 0x334, 0x230, 0x234, 0x130, 0x134
- PCI adapters:
  - IRQ 5, 6, 7, 8, 9, 10, 11, 12, 14, 15
  - I/O Address (Rev. A and B *only*) 0x334, 0x230, 0x234, 0x130, 0x134

Note – I/O addresses are dynamically configured for PCI adapters, Rev. C or later.

Multiple Controller Configuration

If you have multiple BusLogic boards in the system, follow these general rules to configure multiple BusLogic controllers:

- If one of the installed boards is a "C" model, it must be the primary controller.
- If one of the installed boards is a PCI bus model, it must be the primary controller.

- The primary controller must have an I/O address that precedes the secondary controller in the above list of Valid Configurations (as listed from left to right). For example, the primary controller may use an I/O address of 0x234, as long as the secondary controller uses either 0x130 or 0x134.
- The BIOS must be disabled on the secondary controller.
- Wide mode EISA and PCI adapters will support targets greater than 7 if the proper entries are added to the system configuration files, `/kernel/drv/cmdk.conf` (for disk), and `/kernel/drv/cmtp.conf` or `/kernel/drv/st.conf` (for tape).

Known Problems and Limitations

- Using an I/O address of 0x330 will cause the Solaris `aha` driver to be selected instead of the `blogic` native mode driver. These cards have not been tested in Adaptec AHA-1540 mode.
- This release of the `blogic` driver fixes bug 1188122: blogic_chkerr panic while running stress test. This bug caused a panic when running heavy I/O in the presence of intermittent tape accesses.
- If you have BT-946C (Rev. C.), request updated firmware from BusLogic, and install Rev. E or later because that system will be more reliable.
- Do not run the `drvconfig` utility during heavy I/O involving disks and tapes with BusLogic PCI cards since it can cause data overrun errors on disks or tape. This is documented in bug 1217378: blogic data_ovr errors while stress testing (+drvconfig) on BT946C-Rev E.
- BusLogic EISA/PCI cards may cause data overrun errors under high stress when your system is configured with multiple disks. This is documented in bug 1218624: blogic data_ovr errors while stress testing BT-747C Rev. A.

Compaq 53C710, 53C810, 53C825 PCI and EISA SCSI-2 HBAs

Description

The Compaq family of PCI and EISA controllers based on the 53C710, 53C810, and 53C825 chips includes the following:

Compaq Controller	Chip	Available On
Compaq 32-Bit Fast-SCSI-2	53C710	EISA add-in card
Compaq Integrated 32-Bit Fast-SCSI-2	53C710	ProLiant 2000, 4000
Compaq Integrated 32-Bit Fast-SCSI-2/P	53C810	ProSignia 300-PCI, 500-PCI
Compaq Integrated 32-Bit Fast-Wide SCSI-2/E	53C825	ProLiant 4500-EISA
Compaq Integrated 32-Bit Fast-Wide SCSI-2/P	53C825	ProLiant 1500-PCI
Compaq 32-Bit Fast-Wide SCSI-2/P	53C825	PCI add-in card

Note – The Wide SCSI option is not supported under the Solaris operating environment. Some cards include connectors for both narrow cables (8-bit SCSI A cables) and wide cables (16-bit SCSI P cables). You can connect devices to the SCSI Wide connectors using SCSI P cables, but the Solaris `ncrs` driver will not initiate or accept the Wide Data Transfer option. The attached devices will function in 8-bit narrow mode.

Device Configuration

Preparing for Configuration

See the hardware manufacturer's documentation for installation and cabling requirements.

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if the controller's settings need to be changed.**
2. **Use the Compaq EISA configuration utility Version 2.20 Revision B or later.**
   This can be run from the hard disk or from the diskettes that come with your system.

3. **At the MAIN MENU, press ctrl-A to see the Advanced Mode options.**
   A pop-up box shows that Advanced Mode is enabled.

4. **Press Enter.**

5. **Select System Configuration.**

6. **Select Configure Hardware.**
   The program will then ask you to insert the second diskette into the drive.

7. **Press Enter after you have inserted the second diskette.**

8. **Select Configuration Set Up.**

9. **Select Step 2 Add/Remove Board.**
   Follow the instructions on the screen to add your board.

10. **Select Step 3 View or Edit Details.**
    Find the description of the slot with the controller. Use the Page-Down key as needed.

11. **Select BIOS Hard Drive Geometry under the slot description that lists the controller.**

12. **Set this option to <=1 GB: 64 Heads, 32 Sectors > 1GB: 255 Heads, 63 sectors.**
    This will work for disks with sizes greater and smaller than 1 Gbyte.

13. **Press F10 to leave that menu.**

14. **Select Step 5 Save and Exit.**
    Save your changes and exit.

Known Problems and Limitations

The SCSI Tagged Queuing option is not supported.

DPT PM-2011/PM-2021 ISA HBAs

Description

The DPT PM-2011 and PM-2021 host bus adapters are 16-bit SCSI controllers for an ISA or EISA bus.

Device Configuration

Preparing for Configuration

- The EPROM revisions on the board need to be checked. The EPROM should be version 5E or later. The SmartROM should be version 2.C or later.
- The Solaris operating environment supports only two DPT adapters per system.
  - If two DPT PM-2011 or 2021 or 3021 adapters are installed, do not install an IDE controller.
  - If you have an IDE adapter installed, only one DPT adapter will be supported.

Avoiding Possible Device Conflicts

- Since the IDE adapters are configured in the same I/O address range, ensure there is no address conflict with any IDE controller.
- If you have an IDE adapter installed, IRQ 14 should not be used by the DPT adapter.

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if the DPT PM-2011/PM-2021 SCSI HBA settings need to be changed.**
2. **See the DPT manual for a description of the board's jumper settings.**
3. **Follow the instructions in the "DPT PM-2022/PM-2122/PM-3222 EISA HBAs" Device Reference Page to disable WD1003 emulation using the DPT SCSI Storage Manager Utility diskette.**
   Emulation mode for both drives should be set to 0 for drives zero and one, indicating "no drives present."

Note – Failure to disable the emulation modes for drives 0 and 1 will result in missing drives during the system boot process.

Valid Configurations

The parameters for DPT PM-2011/PM-2021 host bus adapters are different for first and secondary adapters:

- First Adapter:
  - I/O Address 0x1F0
  - IRQ 15
  - DMA 5
- Second Adapter:
  - I/O Address 0x230
  - IRQ 14 or 12
  - DMA 6

If you have an IDE adapter installed, the valid parameters for the first (and only) DPT adapter are as follows:

- I/O Address 0x230
- IRQ 12
- DMA 6

Note – Be sure to use Edge-triggered interrupts on the PM-2011.

Known Problems and Limitations

The DPT controller may cause the installation of the Solaris operating environment to fail due to loss of interrupts, depending on the setting of Jumper Y34.
Workaround: If the software installation fails, try changing the setting of Jumper Y34 (even if the onboard floppy has already been disabled by removing Jumper Y20). Toggling this setting appears to enable the controller to function correctly.

DPT PM-2012B EISA HBA

Description

The DPT PM-2012B host bus adapter is a SCSI controller for an EISA bus.

Device Configuration

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if your DPT PM-2012B SCSI HBA settings have to be changed.**
2. **See** *DPT SmartCache Plus User's Manual* **for a description of its configuration program.**
3. **Boot DOS from the diskette drive.**
4. **Insert a copy of the DPT Utility diskette in the diskette drive.**
   a. **Type** `DPTFMT` **and press Enter.**
   b. **Press Enter to begin.**
   c. **Press Enter to continue.**
   d. **Press <F3> to enter SCSI ID 0 and LUN 0.**
   e. **Press <F3> to continue.**
   f. **Use the down arrow to select MS-DOS and PC DOS.**
   g. **Press Enter to write out the drive geometry.**
   h. **Press Enter to reboot.**
5. **Insert the user copy diskette of the EISA configuration utility (CF.EXE) containing the !DPTxxx.CFG files.**
   a. **At the A:> prompt, type** `CFG` **and press Enter.**
   b. **At the Viewer Edit Details screen, press Enter.**

c. **Press the down arrow to the DPT SCSI HBA to select parameters and set them as follows:**

• Bus	Enabled
• IDE Boot Address	Primary
• IRQ	Entry noted on your worksheet
• Option ROM Address	Default
• SCSI ID HBA	Default 7
• WD1003	Emulation off for both drive 0 and 1

• Use Edge-triggered interrupts.

d. **Press F10 to save your changes.**

6. **Insert a copy of the boot diskette.**

7. **Press Enter to reboot DOS.**

Valid Configurations

Following are the DPT PM-2012B SCSI HBA parameters:

• IRQ	Any legal value between 9 and 15

Note – Make sure you use Edge-triggered interrupts.

• WD1003	Emulation off
• Option ROM Address	Default
• I/O Address	*z*C88 (where *z* is a slot number from 1 to 7)

Known Problems and Limitations

- If you have used the DPTFMT utility correctly, and the board is properly seated in your machine, failure to display disk geometry may indicate a defective board.
- In order to prevent system hangs caused by improper IDE emulation, the version number of the EISA !DPTA401.CFG file should be 6B3 or later. If it is not, obtain a newer version from your vendor and rerun the EISA configuration utility.

DPT PM-2022/PM-2122/PM-3222 EISA HBAs

Description

The DPT PM-2022, PM-2122, and PM-3222 host bus adapters are SCSI controllers for an EISA bus. The PM-3222 is a SCSI RAID adapter.

Device Configuration

Preparing for Configuration

Check the EPROM revisions on the board.

- The DPT PM-3222 adapter should have EPROM version 7A or later and SmartROM version 3.B or later.
- The DPT PM-2022 and PM-2122 adapters should have EPROM version 5E or later and SmartROM version 2.D1 or later.

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if the DPT PM-2022/PM-2122/PM-3222 SCSI HBA settings need to be changed.**
2. **See** *DPT SmartCache III User's Manual* **for a description of its EISA configuration program.**
3. **Boot DOS from the diskette drive.**
4. **Insert the user copy diskette of the EISA configuration utility (CF.EXE) containing the !DPTxxxCFG files.**
5. **Make sure the parameters are set as shown under "Valid Configurations."**
6. **Run the DPT SCSI Storage Manager Utility, DPTMGR, under DOS and select Solaris as the operating environment.**
   See Chapter 4 of *DPT SmartCache III User's Manual* for instructions.

Note – An error message similar to the following will be displayed while DPTMGR is running:

```
Unable to find any drivers in the DRIVERS Directory......
```

This message can be ignored.

Valid Configurations

The following are the DPT PM-2022, PM-2122, and PM-3222 SCSI HBA parameters:

- WD1003 Boot Address Disabled (Secondary)
- IRQ Any legal value between 11 and 15, except 14

Note – Make sure you use Edge-triggered interrupts.

- IDE Boot Address Disabled
- SCSI BIOS ROM Address Default
- HBA SCSI ID Default 7

Alternative Custom Configuration

When using the EISA configuration utility supplied by DPT in conjunction with a configuration file, you enter emulation information as part of the configuration process. When you configure two drives, both should be “disabled.” When asked for drive types for drives zero and one, type 0. This indicates “no drives present” and disables the WD1003 emulation mode of the adapter, allowing correct operation of the native mode driver.

Known Problems and Limitations

- In order to prevent system hangs caused by improper IDE emulation, the version number of the EISA !DPTA410.CFG file should be 6E5 or later. If it is not, obtain a newer version from your vendor and rerun the EISA configuration utility.
- The Solaris software installation may initially fail when trying to set up the `fdisk` partition table on one or more disks. The failures have been observed on systems with a disk RAID configuration, where at least one disk is

new or has had its partition table zeroed out. The error messages displayed are:

```
ERROR: Could not create Fdisk partition table on disk
ERROR: Could not label the disks
```

Workaround: If the Solaris software installation fails with these error messages, restart the installation. It will most likely succeed.

IBM Micro Channel SCSI-2 Fast/Wide Adapter/A

Description

The IBM SCSI-2 Fast/Wide Adapter/A is a SCSI controller used with a Micro Channel bus.

Caution – The Solaris `mcis` driver, which supports the IBM Micro Channel SCSI adapter, conflicts with the IBM SCSI-2 Fast/Wide Adapter/A. If your system has an IBM SCSI-2 Fast/Wide Adapter/A installed, you must disable the `mcis` driver before installing Solaris x86. This is done by modifying the Driver Update 10 Boot diskettes using the `corvette.bat` file under DOS; see "Modifying the Driver Update 10 Boot Diskettes" below.

If you already have the Solaris operating environment running on your system and you want to add support for the IBM SCSI-2 Fast/Wide Adapter/A, you should *not* install the adapter until steps have been taken to disable the `mcis` driver; see "Disabling the mcis Driver After Installing Solaris x86" below.

Device Configuration

Preparing for Configuration

Ensure that the controller board is properly installed in any slot between 1 and 8. Slots 9 and above are not supported in this release.

Avoiding Possible Device Conflicts

The IBM SCSI-2 Fast/Wide Adapter/A cannot be installed on a system with the IBM Micro Channel SCSI adapter.

Configuring the Device

The Solaris `mcis` device driver interferes with the proper operation of the IBM SCSI-2 Fast/Wide Adapter/A. To avoid conflicts, the Solaris `mcis` driver must be disabled before the IBM SCSI-2 Fast/Wide Adapter/A and the Solaris software can be installed. You must first modify the Driver Update 10 Boot diskettes and then disable the `mcis` device driver.

Modifying the Driver Update 10 Boot Diskettes

The diskettes must be modified using DOS. As a precaution, you should make a copy of the original Boot diskettes prior to running the special command files.

1. **Boot DOS on your system.**
2. **Insert a blank 3.5-inch diskette into drive A: and format it:**
   `format a:`
3. **Insert "Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   `diskcopy a: a:`
4. **Label the copy of the Boot diskette as "Modified."**
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette for IBM SCSI-2 Fast/Wide Adapter/A."
5. **Insert another blank 3.5-inch diskette into drive A: and format it:**
   `format a:`
6. **Insert "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   `diskcopy a: a:`
7. **Label the copy of the Boot diskette as "Modified."**
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette for IBM SCSI-2 Fast/Wide Adapter/A."
8. **Store your original Boot diskettes in a safe place.**
9. **Insert the copy of "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into diskette into drive A:.**
   Make sure the diskette is writable because the contents will be modified.
10. **Change to drive A: (remember DOS is still running):**
    `a:`
11. **Run the** `corvette.bat` **command:**
    `corvette.bat`

Disabling the `mcis` *Driver After Installing Solaris x86*

Before you can add and configure IBM SCSI-2 Fast/Wide Adapter/A after installing Solaris x86 and before adding Driver Update 10, you must disable the `mcis` driver by modifying a system file and rebooting.

1. **Become root.**
2. **Use a text editor (such as** `vi`**) to edit the** `/etc/system` **file and add the following line:**
   `exclude: mcis`
3. **Remove or comment out the following line, if present:**
   `forceload: drv/mcis`

   To comment out a line in the `/etc/system` file, place an asterisk * at the beginning of the line.
4. **Save your changes and exit the editor.**
5. **Shut down the system and power it off.**
6. **Now perform a reconfiguration boot to make your changes take effect:**

```
# touch /reconfigure
# halt
```

7. **Install your hardware.**
   Use the configuration information in "Valid Configurations" below.
8. **Reboot the system.**

Note – Upon reboot, the IBM Micro Channel SCSI adapter will no longer be recognized by the Solaris software, and it cannot be used in a system with the IBM Micro Channel SCSI-2 Fast/Wide Adapter/A.

Valid Configurations

The following parameters are supported for the IBM SCSI-2 Fast/Wide Adapter/A:

• IRQ	14
• I/O Address	0x3540, 0x3548, 0x3550, 0x3558, 0x3560, 0x3568, 0x3570, 0x3578

Known Problems and Limitations

- The microcode version of the SCSI-2 Fast/Wide Adapter/A board should be 0x71 or later. Boards with older versions, such as version 0x58, may cause the Solaris system to hang when using certain tape drives. The Solaris `corvette` driver displays a warning message if it detects an older, unsupported version of the adapter.
- The IBM SCSI-2 Fast/Wide Adapter/A is currently only supported on systems with at least 32 Mbytes of memory installed.

NCR 53C710 HBAs (Siemens Nixdorf PCE-5S SCSI)

Description

Two NCR 53C710 SCSI host bus adapters are embedded on Siemens Nixdorf PCE-5S systems.

Device Configuration

Note – Because the Siemens Nixdorf BIOS and the Solaris `fdisk` program are not compatible, use the DOS version of FDISK (or equivalent utility) to create an entry in the FDISK partition table before installing the Solaris software. Create at least a 1-cylinder DOS partition starting at cylinder 0. If the DOS partition is not created, the system will fail to reboot after Solaris installation.

Preparing for Configuration

See the hardware manufacturer's documentation for setup and cabling requirements.

Configuring the Device

Use the motherboard CMOS setup utility to make sure that the controllers are enabled and that the IRQ settings do not conflict with another system device.

Known Problems and Limitations

The SCSI Tagged Queuing option is not supported.

NCR 53C8*xx* PCI SCSI HBAs (53C810, 53C815, 53C820, 53C825)

Description

These configuration notes are for the NCR 53C810, 53C815, 53C820, and 53C825 PCI SCSI controllers, which are found on add-in adapters or integrated on a system motherboard. Systems may be configured with multiple controllers.

Device Configuration

Note – Because the NCR BIOS and the Solaris `fdisk` program are not compatible, use the DOS version of FDISK (or equivalent utility) to create an entry in the FDISK partition table before installing the Solaris software. Create at least a 1 cylinder DOS partition starting at cylinder 0. If the DOS partition is not created, the system will fail to reboot after Solaris installation.

Preparing for Configuration

An add-in card with the 53C815, 53C820, or 53C825 controller can only be used in a bus-mastering PCI slot. On motherboards with only two PCI slots usually both of the PCI slots are bus-master capable. On motherboards with three or more PCI slots, and on motherboards with several embedded PCI controllers, some of the PCI slots may not be bus-master capable. Refer to the motherboard or system documentation to determine how to set up or configure which PCI slots are bus-master capable.

Avoiding Possible Device Conflicts

Some PCI motherboards with the NCR SDMS BIOS and an embedded 53C810 controller do not work correctly with 53C815 or 53C82*x* add-in cards which also have an NCR SDMS BIOS. Some PCI motherboards with NCR SDMS BIOS but without the 53C810 controller also may not work correctly with 53C815 or 53C82*x* add-in cards which do not have an NCR SDMS BIOS. If you have a combination that does not work correctly, you may be able to work around these conflicts by upgrading the motherboard BIOS or the add-in card BIOS or both.

Configuring the Device

Run the motherboard CMOS setup or the EISA configuration utility to make sure that the controller and the bus master options are enabled and that the IRQ setting does not conflict with another system device.

Known Problems and Limitations

- The SCSI Tagged Queuing option is not supported.
- Some very early PCI systems with the 53C810 chip on the motherboard do not have the interrupt pin on the chip connected. Such a system cannot be used with the Solaris software. The Solaris `ncrs` driver requires a correctly functioning interrupt line for the 53C810 chip.
- The Wide SCSI option is not supported under the Solaris Operating environment. Some add-in 53C8*xx* cards include connectors for both narrow cables (in other words, 8-bit SCSI A cables) and wide cables (that is 16-bit SCSI P cables.) You can connect devices to the SCSI Wide connectors using SCSI P cables, but the Solaris `ncrs` driver will not initiate or accept the Wide Data Transfer option. The attached devices will function in 8-bit narrow mode.

Trantor T348 MiniSCSI Plus Parallel HBA

Description

The Trantor T348 Parallel SCSI HBA is easy to install—it has no switches or software-settable options, and does not require any manual configuration. However, the MiniSCSI Plus adapter may require special cabling to obtain electrical power and to connect to certain devices.

Device Configuration

Preparing for Configuration

Note – The Trantor MiniSCSI Plus adapter uses electrical power from the TERMPWR signal on the SCSI cable. The adapter will not work unless the first (or only) device connected to it supplies TERMPWR. If you have difficulty using the adapter with Solaris, see the "Troubleshooting Notes" section of *MiniSCSI Plus User Guide* or consult your Trantor dealer.

The T348 ends in a male SCSI-1 connector, for plugging in to a SCSI-1 device. To connect the T348 to a SCSI-2 device, use a SCSI-1 to SCSI-2 cable (which has a male SCSI-1 connector on one end and a male SCSI-2 connector on the other end) and a SCSI-1 female-to-female adapter (to connect the male end of the T348 to the male end of the SCSI-1 to SCSI-2 cable).

Configuring the Device

1. **Install Solaris x86.**
2. **Shut down the Solaris operating environment and turn off the computer.**
3. **Plug the T348 adapter into the selected (or only) parallel port.**
4. **Attach all required SCSI devices to the T348.**
5. **Turn on the power to all the SCSI devices.**
6. **Turn on the computer.**

Alternative Custom Configuration

- When reconfiguring the system to add other devices, make sure the T348 and all its devices are plugged in and powered up; otherwise they will be removed from the configuration. If you accidentally reconfigure without the T348 plugged in, plug it in and repeat the reconfiguration process.
- The Solaris operating environment does not support concurrent use of other parallel devices on the same port as the Trantor T348 or on the T348 pass-through port. To switch between the T348 and another parallel port device, such as a printer or Ethernet adapter, shut down the Solaris operating environment and power off the computer and any SCSI devices attached to the T348. With the power turned off, disconnect the old device and connect the new one. If switching to the T348, power up any SCSI devices you intend to use. Turn on the power to the computer and do a reconfiguration boot using the following commands:

```
# touch /reconfigure
# reboot
```

Known Problems and Limitations

- The Solaris `trantor` driver is intended primarily to support the use of SCSI CD-ROM drives for software installation. The driver also supports limited use of SCSI tape drives for backup and file transfer. Because of low data transfer rates, simultaneous use of multiple SCSI devices or the use of tape blocks longer than 512 bytes is not recommended.
- Do not use simultaneous multiple SCSI devices due to low data transfer rates.
- The T348 and attached devices must be plugged in and powered on at boot time to be available during that session.
- If the SCSI devices attached to the T348 fail to respond after a reconfiguration boot, and the parallel port had previously been used for a different device, do a second reconfiguration boot.
- The Trantor T338 andT358 are not supported.
- The Exabyte EXB-8500 and EXB-8200 tape drives do not work under the Solaris operating environment when connected to the Trantor T348 MiniSCSI Plus Parallel host bus adapter.

Tricord Systems Intelligent SCSI Subsystem (ISS) HBAs

Description

The Tricord Systems Intelligent SCSI Subsystem (ISS) controllers are multi-channel SCSI controllers supported only on the Tricord Systems Enterprise Server Models. The ISS family of controllers supports standard SCSI devices, such as disk, tape, and CD-ROM, as well as RAID groupings of SCSI disk drives.

Device Configuration

Preparing for Configuration

Version 4.03 or later of the system BIOS is required to be able to boot the Solaris operating environment.

Device Naming Convention

The special files that get created on an ISS system are described in the `iss(7)` manual page.

Known Problems and Limitations

Regardless of the number of devices on the ISS controller, a maximum of eight disk devices (physical or logical) will be shown by the realmode driver when installing the Solaris operating environment. This also limits the number of drives that can be used to boot Solaris.

SCSI Disk Arrays/RAID Controllers

Compaq SMART SCSI Array Controller

Description

The Compaq SMART SCSI Array controller supports internal and external SCSI drives on the Compaq family of ProSignia, ProLiant, and Systempro servers. It is used on an EISA bus.

Device Configuration

Preparing for Configuration

Be sure to read the documentation that comes with your hardware. Note the following:

- The SMART controller only supports disk drives. SCSI tape drives and CD-ROM drives are not supported.
- The Boot device *must* be logical drive 0 on the *primary* controller. Even though the BIOS lets you configure any controller as your primary controller, it will only let you boot from logical drive 0 on that controller.

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if the Compaq SMART SCSI Array Controller settings need to be changed.**
2. **Run the EISA configuration utility (ECU) to configure your drives.**

Known Problems and Limitations

If you want to change your RAID configuration, first delete the old configuration information using the ECU. If you physically move the disks prior to deleting the RAID configuration (or the partition information on the logical drives), you may not be able to boot your system.

DPT PM-2024/PM-2124/PM-2124W/PM-3224/PM-3224W PCI HBAs

Description

The DPT PM-2024, PM-2124, PM-2124W, PM-3224, and PM-3224W are SCSI controllers for a PCI bus. The PM-3224 and PM-3224W are SCSI RAID adapters.

Device Configuration

Preparing for Configuration

- Check the EPROM revisions on the board.
  - The DPT PM-3224 should have EPROM version 7A or later.
  - The DPT PM-2024 and PM-2124 adapters should have EPROM version 6D4 or later.
  - All the PCI boards should have SmartROM version 3.B or later.
- Ensure that the controller board is properly installed in any PCI slot capable of bus–mastering.

Configuring the Device

1. **Use the CMOS configuration utility supplied by the computer vendor to enable the DPT PCI controller.**

   a. **Enable the DPT PCI controller.**

   b. **Enable the PCI slot.**

   c. **Enable bus mastering.**

   d. **Choose an unused IRQ between 9 and 15.**

Note – If IRQ 12 does not respond, try another unused IRQ.

---

2. **Enter the DPT Configuration Utility by typing Ctrl-D at controller boot time.**

   a. **Set I/O address to "`Auto`."**

b. If the firmware version of the controller is less than 7A, or if your computer memory is ECC or does not check parity, disable PCI parity checking.

Known Problems and Limitations

If the boot diskette reports a DPT controller driver cannot be installed, the motherboard installed in your system probably has ECC memory or does not check parity; disable PCI parity checking.

IBM DMC960 RAID Micro Channel HBAs (IBM SCSI-2 RAID, IBM SCSI-2 Fast/Wide Streaming-RAID Adapter/A)

Description

The IBM DMC960 RAID Micro Channel bus controllers include the IBM SCSI-2 RAID and the IBM SCSI-2 Fast/Wide Streaming-RAID Adapter/A.

Device Configuration

Preparing for Configuration

- The choice of SCSI target ID numbers is limited. Assuming the maximum number of targets per channel on the particular model IBM host bus adapter is MAX_TGT, the SCSI target IDs on a given channel should range from 0 to (MAX_TGT – 1). See the vendor documentation for more information.
- SCSI target IDs on one channel can be repeated on other channels.

  Example:
  The IBM DMC960 model supports a maximum of seven targets per channel, that is, MAX_TGT = 7. Therefore, the SCSI target IDs on a given channel should range from 0 to 6.

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if the IBM DMC960 settings need to be changed.**
2. **Follow the configuration instructions in the vendor's manual.**

Known Problems and Limitations

- If a SCSI disk drive is not defined to be part of any physical pack within a system drive, it is automatically labeled as a *standby* drive. If any SCSI disk drive within a system drive fails, data on a standby drive *may be lost* due to the standby replacement procedure. This procedure will overwrite the standby drive if the failed disk drive is configured with any level of redundancy (RAID levels 1, 5, and 6) *and* its size is identical to the size of the available standby drive.

- Other than the “hot replacement” of disk drives, which is described in the manufacturer’s user’s guide, the IBM DMC960 series does not currently support “hot-plugging” (adding or removing devices while the system is running). To add or remove devices you must shut down the system, add or remove devices, reconfigure the host bus adapter using the configuration utility provided by the manufacturer, and then reboot your system.
- **(1210290)** Some tape drives may prematurely report "tape full" when writing to tape under heavy system load. This has been seen with the Archive Viper 150 tape drive, for example.
- **(1212018)** The command `mt erase` works but reports the following error message when it gets to the end of the tape:

```
/dev/rmt/0 erase failed: I/O error
```

Mylex DAC960P PCI Controller

Description

The Mylex DAC960P is a SCSI controller used with a PCI bus.

Device Configuration

Preparing for Configuration

- The choice of SCSI target ID numbers is limited. Assuming the maximum number of targets per channel on the particular model of Mylex host bus adapter is MAX_TGT, the SCSI target IDs on a given channel should range from 0 to (MAX_TGT – 1). See the vendor documentation for more information.
- SCSI target IDs on one channel can be repeated on other channels.

  Example:
  The Mylex DAC960P model supports a maximum of seven targets per channel, that is, MAX_TGT = 7. Therefore, the SCSI target IDs on a given channel should range from 0 to 6.

Configuring the Device

Consult your Device Configuration Worksheet to see if the Mylex DAC960P settings need to be changed.

Valid Configurations

Follow the configuration information in the manufacturer’s installation manual.

Known Problems and Limitations

- If a SCSI disk drive is not defined to be part of any physical pack within a system drive, it is automatically labeled as a *standby* drive. If any SCSI disk drive within a system drive fails, data on a standby drive *may be lost* due to the standby replacement procedure. This procedure will overwrite the standby drive if the failed disk drive is configured with any level of redundancy (RAID levels 1, 5, and 6) *and* its size is identical to the size of the available standby drive.

- Other than the "hot replacement" of disk drives, which is described in the manufacturer's user's guide, the Mylex DAC960P series does not currently support "hot-plugging" (adding or removing devices while the system is running). To add or remove devices you must shut down the system, add or remove devices, reconfigure the host bus adapter using the configuration utility provided by the manufacturer, and then reboot your system.
- **(1212018)** The command `mt erase` works but reports the following error message when it gets to the end of the tape:

```
/dev/rmt/0 erase failed: I/O error
```

Other SCSI Devices

SCSI Tape Drives

Description

The SCSI tape drive support on x86 platforms offers the following features:

- Full compatibility between Solaris SPARC™ and Solaris x86 platforms
- Stability, robustness, and increased SCSI tape drive support
- Field extensibility; support for new tape drives can be added by editing a configuration file (`st.conf`)
- Tape control; required by commercial backup software, such as Legato Networker
- Configurable write buffering (as an option)

In addition, significant interoperability testing ensures that tapes written with the `sctp` driver can be read by the `st` driver. For a list of supported SCSI tape drives, see the latest Solaris x86 Hardware Compatibility List.

Device Configuration

Preparing for Configuration

- If you have a supported SCSI tape drive, no configuration is necessary.
- If your tape drive is not supported, find the SCSI tape control commands in the manufacturer's SCSI command manual (sometimes called an OEM technical manual) so you can update the `/kernel/drv/st.conf` file and add support for your tape drive.

Configuring the Device

The information that is needed in the `/kernel/drv/st.conf` file is described in the `st(7D)` manual page.

1. **Install Solaris x86.**
2. **Become root.**

3. **Edit the file** `/kernel/drv/st.conf` **and add the appropriate lines that describe your tape drive.**
   For example, to add an entry for the Hewlett-Packard HP35470A tape drive, the following two lines would be needed:

   ```
   "HP       HP35470A", "HP35470A 4mm DAT", "HP70",

   HP70   =     1,0x34,0,0x1679,1,0x0,0;
   ```

Note – The format of these lines is described in `st(7D)`; the placement of each line is shown in the file `/kernel/drv/st.conf`.

After adding these lines, the `/kernel/drv/st.conf` file will look similar to this:

```
tape-config-list=
    "HP      HP35470A",    "HP35470A 4mm DAT", "HP70",
    "WANGTEK 5525ES SCSI", "Wangtek 525MB QIC","WT_5525ES_QIC",
    "TANDBERG 4100",      "Tandberg 4100 QIC",    "TANDBERG_4100_QIC",
    "TANDBERG 4200",       "Tandberg 4200 QIC","TANDBERG_4200_QIC";

HP70          = 1,0x34,0,0x1679,1,0x0,0;
WT_5525ES_QIC = 1,0x32,512,0x467a,1,0x00,0;
TANDBERG_4100_QIC = 1,0x32,512,0x463a,1,0x00,0;
TANDBERG_4200_QIC = 1,0x32,512,0x463a,1,0x00,0;
```

4. **Perform a reconfiguration boot to have your changes take effect:**

```
# touch /reconfigure
# reboot
```

Ethernet Network Adapters

3Com EtherLink 16 (3C507)

Description

The 3Com EtherLink 16 card is an Ethernet network adapter.

Device Configuration

Preparing for Configuration

- The manual for the 3Com EtherLink 16 card specifies that the base address of the card's shared RAM can be configured to several different addresses; however, the Solaris software does not support the `F0000`, `F4000`, `F8000`, and `FC000` addresses.
- The 3Com EtherLink 16 Ethernet adapter has an on-board buffer of 64 Kbytes. Using the configuration utility supplied by 3Com, you can configure the card to use the full 64 Kbytes, or a smaller amount.

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if your 3Com EtherLink 16 controller needs to be reconfigured.**
2. **Follow the 3Com documentation and use the 3Com setup software to configure the card.**
   Be sure you set the Data Mode from standard to Turbo.

Known Problems and Limitations

If the EtherLink 16 adapter is configured for less than 64 Kbytes of memory, the adapter may fail. Using the manufacturer's configuration utility, configure the adapter to use 64 Kbytes of memory even when the full 64-Kbyte memory range is unavailable. After reconfiguring it to the desired memory size, the system can usually access the network.

3Com EtherLink III (3C5*x*9, 3C509B)

Description

The 3Com EtherLink III 3C5*x*9 and 3C509B controllers are Ethernet network adapters.

Device Configuration

Preparing for Configuration

- Configure the 3C509 (ISA bus) adapter for EISA addressing when installed in an EISA bus system.
- The 3C509B model is configured differently than the other models. Check the packaging material that comes with your adapter to verify that the "3C509B" designation is on the outside of the box and that the network card is labeled "Rev.B."

Configuring the Device

1. **Consult your Device Configuration Worksheet to see if your 3Com EtherLink III controller needs to be reconfigured.**
   The EtherLink III 3C509B must always be reconfigured.
2. **Follow the 3Com documentation and use the 3Com setup software to configure the card.**

EtherLink III 3C509B Configuration

1. **Configure the card to use a specific network interface using the 3Com setup software. Do *not* use the Auto Select option.**
   Since Auto Select is the default, you must always reconfigure the card.
2. **Disable the Plug and Play option.**
   This is particularly important on Plug and Play–capable systems.

AMD PCnet Ethernet (PCnet-ISA, PCnet-PCI)

Description

The PCnet family of Ethernet controllers are based on the AMD PCnet-ISA and PCnet-PCI controller chips. These include PCnet controllers embedded on motherboards found in systems from Intergraph and Hewlett-Packard, and a variety of add-in NICs.

Device Configuration

Avoiding Possible Device Conflicts

The Solaris `elink` driver may interfere with the proper operation of PCnet-ISA adapters installed on the Intergraph TD-1, TD-2, and TD-3 Personal Workstations.

Modifying the Driver Update 9 Boot Diskettes

If you are installing the Solaris software over a network that uses a PCnet-ISA adapter, and you experience problems with the network hanging, it may be necessary to exclude the `elink` driver from the boot diskettes before attempting to install again.

There are special command files on the boot diskettes for these purposes. The diskette must be modified using DOS. As a precaution, you should make a copy of the original Boot diskettes prior to running the special command files.

1. **Boot DOS on your system.**
2. **Insert a blank 3.5-inch diskette into drive A: and format it:**
   `format a:`
3. **Insert "Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   `diskcopy a: a:`
4. **Label the copy of the Boot diskette as "Modified."**
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette for AMD PCnet Ethernet."

5. **Insert another blank 3.5-inch diskette into drive A: and format it:**
   `format a:`

6. **Insert "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   `diskcopy a: a:`

7. **Store your original Boot diskettes in a safe place.**

8. **Label the copy of the Boot diskette as "Modified."**
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette for AMD PCnet Ethernet."

9. **Insert the copy of "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into drive A:.**
   Make sure the diskette is writable because the contents will be modified.

10. **Change to drive A: (remember DOS is still running):**
    `a:`

11. **Run the** `pcnet.bat` **command file:**
    `pcnet`

Configuring the Device

PCnet-ISA

Be sure that your PCnet-ISA adapter does not conflict with other adapters configured in the system. The valid parameter settings for PCnet-ISA are listed under "Valid Configurations."

PCnet-PCI

PCI devices are autoconfigured by the system BIOS. No configuration is necessary.

Valid Configurations

The following parameters are supported for PCnet-ISA adapters:

- IRQ — 3, 5, 9, 10, 11
- I/O Address — 0x300, 0x320, 0x340, 0x360

Known Problems and Limitations

- In some cases, IRQ 4 may be offered as a configuration option for the PCnet-ISA adapters; the Solaris `pcn` driver does not support IRQ 4.
- On some systems, particularly those with PCI controllers, IRQ 9 may not be usable by a PCnet-ISA adapter; configure the PCnet-ISA adapter to use another interrupt. PCnet-PCI adapters are not affected.
- Some versions of the PCnet-PCI chip have known problems that result in unreliable network operation. These chip problems can also cause the system to completely "freeze." Unfortunately, there are no known software workarounds. If you encounter these symptoms while using an adapter based on a PCnet-PCI chip, contact the adapter vendor to see if the adapter contains the version of the chip known to exhibit these problems.
- **(1192044)** PCnet doesn't serve `rpl` requests until `snoop` is started.
  Any adapter supported by the Solaris `pcn` driver will not function as a network installation server unless the `snoop` command is also run using that adapter. This will be fixed in a future Driver Update.

Compaq NetFlex-2 DualPort ENET, NetFlex-2 ENET-TR EISA Controllers

Description

The Compaq NetFlex-2 DualPort ENET controller provides two Ethernet interfaces under the Solaris operating environment. The Compaq NetFlex-2 ENET-TR controller can be configured for either Ethernet or token ring, but only the Ethernet functionality is supported under the Solaris operating environment.

Both the NetFlex-2 DualPort ENET and the NetFlex-2 ENET-TR are EISA bus controllers.

Device Configuration

Preparing for Configuration

Compaq NetFlex-2 DualPort ENET *only*: If the dual-ported Ethernet card will be used to install Solaris over a network, the connector for the network must be connected to the *first* network port (Port 1). See the documentation that comes with the dual-ported card to locate Port 1.

Avoiding Possible Device Conflicts

- Check for IRQ conflicts with ISA devices not defined in the EISA configuration software.
- The default IRQ is 10, which can be a usable IRQ for many ISA cards, including SMC Ethernet cards, for example.

Note – The Compaq NetFlex-2 DualPort ENET card shares the same IRQ for both ports.

Configuring the Device

Use the EISA configuration utility to tell the system about the card.

1. **Set the connector type; use DB-15 or 10BaseT RJ-45.**

- For the NetFlex-2 DualPort ENET, using DB-15 connectors requires a special splitter cable that ships with the board.

- The default setting (DB-9) on the NetFlex-2 ENET-TR needs to be changed.

2. **Compaq Netflex-2 ENET-TR card *only*: Configure this card to use a 10 Mb/sec data rate, not the default (16 Mb/sec).**

Valid Configurations

The following IRQs are valid for this card:

- IRQ 3, 5, 9, 10, 11

Known Problems and Limitations

Promiscuous mode is not supported by the current release of the firmware for this card.

DEC 21040, 21041, 21140 Ethernet

Description

The Solaris `dnet` driver supports a large family of Ethernet and Fast Ethernet controllers based on the DEC 21040, 21041, and 21140 controller chips. Refer to the tables under "Valid Configurations" for a list of tested controllers.

Device Configuration

Preparing for Configuration

The following paragraphs describe several properties that can be set in the `dnet.conf` file. In each case the property must be placed within the entry that corresponds to your controller. That entry can be determined by looking at the device file that is created. For example, if the `ls -l` command returns the following:

```
# ls -l /dev/dnet0
# lrwxrwx  1  root  root  <date> dnet0 -> ../devices/isa/dnet@78,0:dnet0
```

the `78` in the entry corresponds to the `reg=0x000078,0,0` entry in the `dnet.conf` file. For example, to set the connector type to BNC/AUI for the following entry:

```
name="dnet" class="sysbus" intr=1 reg=0x000078,0,0 parent-type="pci";
```

change it to:

```
name="dnet" class="sysbus" intr=1 reg=0x000078,0,0 bncaui=1 parent-type="pci";
```

- The Solaris `dnet` driver is configured for optimal performance on today's 10 Mbps networks, running in half-duplex mode. When used with a modern 100 Mbps Fast Ethernet switch, running the driver in full-duplex mode will increase performance. To configure a controller to run in full-duplex mode, set the `fulldup=1` property in the `dnet.conf` driver configuration file.
- This driver does not support autoconfiguration of the network media. The RJ-45 connector is used by default. If you use another network media (BNC/AUI), you will not be able to install from the network. After installation you can force configuration of the BNC/AUI connector by setting the `bncaui=1` property in the `dnet.conf` driver configuration file.

- Some versions of controllers based on the DEC 21140 chip offer a choice between 100 Mbps Fast Ethernet and 10 Mbps Ethernet operation. By default, the `dnet` driver will operate the controller at 100 Mbps Fast Ethernet. To force 10 Mbps Ethernet operation on one of these controllers, set the `mode=10` property in the `dnet.conf` driver configuration file. Dual-speed controllers cannot be forced to 10 Mbps Ethernet operation during installation.

Note – It is not necessary to change the configuration file for the AsanteFAST 10/100 device. It automatically selects the correct speed both during and after installation.

Valid Configurations

The PCI configuration process varies from system to system. Follow the instructions provided by the vendor.

Successfully tested 21040/21041-based adapters:

Adapter Name	TP	BNC	AUI
Cogent EM960C	Yes	Yes*	No
Cogent EM960TP	Yes	N/A	N/A
D-Link DE-530CT	Yes	Yes[1]	N/A
SMC EtherPower 8432BT (21040)	Yes	Yes[1]	N/A
SMC EtherPower 8432BTA (21040)	Yes	Yes[1]	No
SMC EtherPower 8432BT (21041)	Yes	Yes[1]	N/A
SMC EtherPower 8432BTA (21041)	Yes	Yes[1]	No
Znyx EtherAction ZX312	Yes	Yes[1]	No

1. `bncaui=1` property must be added to the `dnet.conf` file. BNC/AUI operation is not available during initial installation.

Successfully tested 21140-based adapters:

Adapter Name	100 Mbps	10 Mbps
AsanteFAST 10/100	Yes	Yes
Cogent EM100TX	Yes	N/A
Cogent EM110TX	Yes	No
SMC EtherPower 10/100 9332DST	Yes	Yes[1]
Znyx EtherXtend ZX342	Yes	Yes[1]

1. mode=10 property must be added to the `dnet.conf` file. 10 Mb operation is not available during initial installation.

Known Problems and Limitations

- The `dnet` driver does not support netbooting from BNC or AUI network media. You must install from a CD and then make changes to `dnet.conf` as described in “Preparing for Configuration.”
- The adapters and configurations listed above have been successfully tested with the `dnet` driver. Other adapters may work with the `dnet` driver, and additional boards will be tested in the future. However, some boards have failed to work with this driver (for example quad-port boards from Cogent and Znyx). Support for these and other DECchip-based adapters will be included in future releases of this driver.
- The current release of this driver provides 100 Mbps Fast Ethernet support; however, the driver will not be able to transfer the data at rates expected of a 100 Mbps Fast Ethernet interface. The performance of the driver is under study, and a future release of this driver will enhance and address the performance characteristics of this driver.

Intel EtherExpress 16, 16C, 16TP, MCA, MCA TP

Description

The Intel EtherExpress™ 16 is an Ethernet controller for the connectionless Data Link Provider Interface providing multithreaded, loadable STREAMS functionality that can be cloned.

Device Configuration

Preparing for Configuration

When using any version of the EtherExpress 16 adapter, you must use the SOFTSET configuration utility to manually configure the appropriate connector. This DOS program is supplied by the network card manufacturer and is contained on a diskette that comes with the board.

Avoiding Possible Device Conflicts

The Intel EtherExpress 16 conflicts with the SMC 8013 card. If both the SMC 8013 and Intel EtherExpress 16 cards are installed in your system, data to and from the Intel EtherExpress 16 card will be randomly corrupted.

Configuring the Device

The Micro Channel versions of this adapter (Intel EtherExpress MCA and Intel EtherExpress MCA TP) can be configured to use IRQs 12 and 15, but these IRQs are *not* supported by the Solaris `iee` driver. Run the SOFTSET configuration utility in manual mode to make certain a valid IRQ is selected.

Known Problems and Limitations

- Autodetect is not supported.
- On some fast systems, the Solaris `iee` driver occasionally does not correctly initialize when the system reboots. If this occurs, the network connection will not be usable.
  Workaround: If this situation occurs, there are two options to get around this problem: 1) reboot the system, or 2) activate the network manually by

stopping and then starting the affected `iee` interface using the `ifconfig` command. For example, if the `iee0` interface fails to start up, log in as the superuser and type the following commands:

```
# ifconfig iee0 down
# ifconfig iee0 up
```

Intel EtherExpress PRO

Description

The Intel EtherExpress PRO is an Ethernet controller for the connectionless Data Link Provider Interface and is used with an ISA bus.

Device Configuration

Configuring the Device

1. **The Intel EtherExpress PRO can be configured to any I/O address that does not conflict with another device.**
2. **Choose one of the valid IRQ values listed below.**
3. **For all other settings, use the defaults.**

Valid Configurations

The following parameters are valid for the Intel EtherExpress PRO controller:

- IRQ — 3, 5, 9, 10, 11 (10 is recommended)
- I/O Address — Any I/O address that does not conflict with another device; 0x300 is recommended

Intel EtherExpress PRO/100 (82556)

Description

The Intel EtherExpress PRO/100 is an Ethernet controller. Both the EISA and PCI bus controllers are supported.

Device Configuration

Preparing for Configuration *(PCI Only)*

On some PCI systems, the user has control over assignments of IRQs to ISA and PCI devices. In the chipset configuration of your particular system, verify that an IRQ is enabled for use by the PCI bus. For example, your PCI CMOS setup screen may show the following:

```
IRQ 9     Enabled for ISA card
IRQ 10    Enabled for ISA card
IRQ 14    Enabled for PCI card
IRQ 15    Enabled for PCI card
```

Use this opportunity to toggle your choices from ISA to PCI, or from PCI to ISA, depending on your hardware configuration. It is preferable to assign as many IRQs to PCI devices as possible. By configuring more *available* IRQs for PCI devices, you give the PCI bus additional choices to resolve conflicts.

Avoiding Possible Device Conflicts

Avoid using IRQ 9 because it is often used for the video card in some systems.

Configuring the Device

Intel EtherExpress PRO/100 EISA

1. **Consult your Device Configuration Worksheet to see if your Intel EtherExpress PRO/100 controller needs to be reconfigured.**

2. **Using the EISA configuration utility, set the following parameters:**

   a. **Disable Flash Memory.**

   b. **Set your Connector Type to TPE.**

c. **If necessary, reconfigure using the software setup program or the diagnostic tools provided by Intel.**

Intel EtherExpress PRO/100 PCI

1. **Consult your Device Configuration Worksheet to see if your Intel EtherExpress PRO/100 controller needs to be reconfigured.**

2. **If necessary, reconfigure using the software setup program or the diagnostic tools provided by Intel.**

Valid Configurations

Intel EtherExpress PRO/100 (*EISA only*):

- IRQ 3, 7, 12, 15

Known Problems and Limitations

- Due to hardware restrictions, avoid installing the EISA model of the Intel EtherExpress PRO/100 card on systems with a PCI bus.
- The Intel EtherExpress PRO/100 card cannot be used as a net install boot server.
- The Intel EtherExpress PRO/100 card cannot net install at 100 Mbps.
- Some revisions of `ieef`-supported PCI network cards may exhibit an intermittent error under heavy stress, where the interface suddenly drops off the network (and carrier sense-lights go off on the card). The bug, under investigation, appears to be a PCI bus starvation problem. Use `ifconfig` to reinitialize the card. For example, as root, type:

```
# ifconfig ieef0 down
# ifconfig ieef0 unplumb
# modunload -i 0
# ifconfig ieef0 plumb
# ifconfig ieef0 <IP_Address> netmask + broadcast + -trailers up
```

- The current release of this driver provides 100 Mbps Fast Ethernet support; however the driver will not be able to transfer the data at rates expected of a 100 Mbps Fast Ethernet interface. The performance of the driver is under study and a future release of this driver will enhance and address the performance characteristics of this driver.

- The current `ieef` driver does not support auto-detection of the Ethernet speed, so the board's speed has to be explicitly configured. To choose 100 Mbps, add `speed=100` to the appropriate line in `/kernel/drv/ieef.conf`. Use 10 instead of 100 for 10 Mbps. The default speed is 10 Mbps.

Novell NE2000, NE2000plus Ethernet and Clones

Description

The Novell NE2000 and NE2000plus are ISA bus Ethernet controllers. The NE2000plus card is software configurable; the NE2000 card must be manually configured with dip switches and jumpers.

Caution – The NE2000/NE2000plus adapters are sensitive to autoprobing by other drivers, and require autoprobe reset sequences that may disturb other cards. To avoid conflicts, the NE2000/NE2000plus cards cannot be installed on a system with the Solaris drivers listed below.
In addition, the Solaris `nei` driver is disabled by default. You enable it using a script (`nov2000.bat`) on the boot diskettes that will disable the other drivers and enable the `nei` driver; see "Modifying the Driver Update 10 Boot Diskettes" below.
If you already have the Solaris operating environment running on your system and you want to add support for the NE2000 or NE2000plus adapter, do *not* install the adapter until you disable other drivers; see "Enabling Support for Controllers After Installing Solaris x86" below.

The following supported hardware cannot be used with NE2000 and NE2000plus cards.

Solaris Driver	Supported Hardware
`eepro`	Intel EtherExpress PRO
`el`	3Com EtherLink II (3C503), EtherLink II/16 (3C503-16)
`elink`	3Com EtherLink 16 (3C507)
`iee`	Intel EtherExpress 16, 16C, 16TP, MCA, MCA TP
`pcn`	AMD PCnet Ethernet (PCnet-ISA, PCnet-PCI)
`smc`	SMC EtherEZ, EtherCard Elite16 Ultra, EtherCard PLUS Elite16, EtherCard PLUS (8416, 8216, 8013, 8003)
`tiqmouse`	Texas Instruments TravelMate 4000E QuickPort Ball Point Mouse

Device Configuration

Preparing for Configuration

The NE2000/NE2000plus Ethernet cards present special problems for configuration. Various early versions and some clones of these models may hang the system when probed. The large I/O space used by the card (0x20 bytes) also increases the chance of conflicts with other devices. To avoid these problems, read and follow the advice on the next few pages.

- The Solaris `nei` driver expects the NE2000/NE2000plus card to be in a 16-bit ISA slot. Ensure that the card is in a 16-bit slot and is jumpered for 16-bit operations.
- Some NE2000/NE2000plus clones allow you to configure the bus speed; the bus speed on the card should match that of the system.
- Certain I/O base addresses (0x320, 0x340, and 0x360) are not supported under the Solaris operating environment. These are described in the next section.

Avoiding Possible Device Conflicts

- Due to the large I/O space (0x20 bytes) used by the NE2000/NE2000plus cards, the I/O base addresses of 0x320, 0x340, and 0x360 are not supported by default because of conflicts with other drivers. This leaves only 0x300 for the NE2000, and 0x240, 0x280, 0x2C0, and 0x300 for the NE2000plus.
- Unfortunately, some NE2000 clones will not operate at all combinations of I/O base address and IRQ settings, so configuration may be further restricted to the default values of IRQ 3 and I/O base address 0x300. Be sure to read the configuration information in the manual provided by the manufacturer of the card.

Caution – *Never* use an IRQ or I/O base address other than the ones listed under "Valid Configurations," even if they are supported by the NE2000/NE2000plus card. Due to conflicts with other Solaris drivers, for example, the I/O base addresses of 0x320, 0x340 and 0x360 are specifically disallowed in the Solaris `nei.conf` file.

- **For NE2000plus cards *only*:** If the card has been configured to run in SHARED MEMORY mode, it will use 0x4000 bytes of shared memory in the range 0xD0000-0xDFFFF. Be sure to check that the BIOS setup allocates this range of memory to the adapter and that other cards in the system do not conflict. If a conflict is unavoidable, configure the NE2000plus in I/O mode so that it will not use shared memory. (To configure the NE2000plus card, a vendor-supplied DOS program PLUSDIAG must be used.)

Modifying the Driver Update 10 Boot Diskettes

Because the Novell NE2000/NE2000plus Ethernet adapters are disabled by default, there are command files on the Boot diskettes to enable the `nei` device driver. The Boot Diskettes must be modified using DOS. As a precaution, make a copy of the original Boot diskettes prior to running the special command file.

1. **Boot DOS on your system.**

2. **Insert a blank 3.5-inch diskette into drive A: and format it:**
   ```
   format a:
   ```

3. **Insert "Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   ```
   diskcopy a: a:
   ```

4. **Label the copy of the Boot diskette as "Modified."**
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 REALMODE Boot Diskette for NE2000/NE2000plus adapter."

5. **Insert another blank 3.5-inch diskette into drive A: and format it:**
   ```
   format a:
   ```

6. **Insert "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into drive A:, make a copy of it, and remove the diskette:**
   ```
   diskcopy a: a:
   ```

7. **Label the copy of the Boot diskette as "Modified."**
   For example:
   "Modified Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette for NE2000/NE2000plus adapter."

8. **Store your original Boot diskettes in a safe place.**

9. **Insert the copy of "Solaris 2.4 x86 Driver Update 10 SOLARIS Boot Diskette" into drive A:.**
   Make sure the diskette is writable because the contents will be modified.

10. **Change to drive A: (remember DOS is still running):**
    ```
    a:
    ```

11. **Run the** `nov2000.bat` **command file:**
    ```
    nov2000
    ```

Now the Driver Update 10 Boot diskettes are prepared to install the Solaris software on your system.

Enabling Support for Controllers After Installing Solaris x86

If you already have the Solaris x86 operating environment running on your system and you want to add an NE2000 or NE2000plus Ethernet card, disable the conflicting drivers that are already installed on your system *prior* to installing the NE2000/NE2000plus card but *after* installing the Solaris software.

1. **Become root.**

2. **Use a text editor (such as** `vi`**) to edit the** `/etc/system` **file, and add the following lines:**
    ```
    exclude: eepro
    exclude: el
    exclude: elink
    exclude: iee
    exclude: pcn
    exclude: smc
    exclude: tiqmouse
    forceload: drv/nei
    ```

3. **In the** `/etc/system` **file, remove or use an asterisk (*) to comment out the following lines:**
    ```
    exclude: nei
    forceload: drv/eepro
    forceload: drv/el
    forceload: drv/elink
    forceload: drv/iee
    forceload: drv/pcn
    forceload: drv/smc
    ```

4. **Add or uncomment the following line:**
    ```
    set nei:nei_forceload=1
    ```

5. **Save your changes and exit the editor.**

6. **Now perform a reconfiguration boot to make your changes take effect:**

```
# touch /reconfigure
# init 0
```

7. **Shut down the system and turn it off.**
8. **Install the NE2000 or NE2000plus card and configure it according to the information "Valid Configurations."**
9. **Turn the system on and allow it to reboot.**

Note – Upon reboot, the Ethernet cards listed on this device page will no longer be recognized by the Solaris software and cannot be used in the system with the NE2000/NE2000plus.

---

10. **If the newly installed NE2000/NE2000plus Ethernet card is replacing another network card that uses a different network driver, you need to rename the** `/etc/hostname.`*olddriver*`0` **file to** `/etc/hostname.`*newdriver*`0` **before rebooting a second time.**
    For example, if you have replaced a 3Com EtherLink III card with a NE2000 or NE2000 plus card, you need to run the following command as root:

```
#  mv /etc/hostname.elx0 /etc/hostname.nei0
```

11. **Perform a normal reboot to bring your network into operation:**

```
# reboot
```

Configuring the Device

The NE2000 card is configured using dip switches. These must be set prior to installing the card. The NE2000plus card is configured using the vendor-supplied DOS program PLUSDIAG. To use it, the NE2000plus card must first be installed in your system.

1. **Set the IRQ to one of the interrupts listed under "Valid Configurations."**

2. **Set the I/O base address to one of the values listed under "Valid Configurations."**

3. **Set the bus speed and bus width to match that of the system.**

4. **For NE2000plus cards *only*: The SHARED MEMORY address should be set starting from 0xD0000, increasing by 0x4000 for each additional card.**

Valid Configurations

Note that some NE2000 clones may further restrict these choices.

NE2000:

• IRQ	2, 3, 4, 5
• I/O Base Address	0x300

NE2000plus:

• IRQ	2, 3, 4, 5, 10, 11, 12, 15
• I/O Base Address	0x300, 0x240, 0x280, 0x2C0
• SHARED MEMORY	0xD0000-0xDC000

Novell NE3200 EISA Ethernet

Description

Novell NE3200 EISA Ethernet controller.

Device Configuration

Preparing for Configuration

- The Novell NE3200 Ethernet card must be installed in an EISA slot.
- The media type must be decided before the device is configured. For example, the media type may be BNC (thin wire) or DIX (thick wire).

Avoiding Possible Device Conflicts

Proper EISA device configuration ensures no conflicts with other devices.

Configuring the Device

1. **Use the EISA configuration utility on your system to configure the controller.**
2. **Set the media type to either BNC or DIX.**
3. **Set the interrupt type to LEVEL TRIGGERED.**
4. **Choose an IRQ that is not taken by another device.**
   Note that IRQs for ISA devices are not usually displayed in the EISA configuration utility.

Valid Configurations

All of the EISA configurable parameters are also valid under the Solaris operating environment. As with any device, be wary of interrupt sharing.

Known Problems and Limitations

- If error messages such as "no such device" are displayed when attempting to access the Ethernet card, the device is probably not configured in the EISA configuration.

- Some NE3200 clones do not work with level-triggered interrupts.
  If you install an NE3200 card and your system hangs while trying to configure devices after reboot, it may not work with level-triggered interrupts.
  Workaround: Use the EISA configuration utility to select an interrupt type of EDGE TRIGGERED instead of LEVEL TRIGGERED.

Racal InterLan ES3210/ES3210 TP EISA Ethernet

Description

The Racal InterLan ES3210 is a 32-bit Ethernet adapter compatible with an EISA bus. The card comes in two versions:

- ES3210 supports standard Ethernet (10Base5) and thin Ethernet (10Base2).
- ES3210 TP supports standard Ethernet (10Base5) and unshielded twisted-pair (10BaseT).

The ES3210 cards are based on the National 8390 network interface controller.

Note – Only the latest revision of the ES3210 is supported—it uses surface-mount technology; the earlier revision does not. The older boards have a white sticker on the back bearing the number 625-0136-00; the newer cards have the number 625-0367-00 or higher.

Device Configuration

Preparing for Configuration

- The Solaris driver for the ES3210/ES3210 TP does not support I/O-mapped I/O. Since this is the default setting for each card (“Shared memory disabled”), it must be changed. An explicit address for the memory area on the board must be configured as described under “Configuring the Device.”
- The driver currently does not use DMA channels 0-3 since 32-bit burst mode DMA transfers cannot be accomplished on these channels. The driver forcibly uses memory-mapped I/O even when one of these DMA channels is configured.

Avoiding Possible Device Conflicts

- Check the IRQ levels used by devices on your system. The default setting for the IRQ on this Ethernet adapter is 3, which is typically used by `COM2`. IRQ 6 is typically used by the diskette controller.
- The choices for shared memory on the Racal InterLan ES3210 are C0000, C4000, C8000, CC000, D0000, D4000, D8000, and DC000; however, note that C0000-C3FFF is used by the VGA BIOS, if present.

Configuring the Device

Use the EISA configuration utility for your system to make the following settings for the ES3210 card:

1. **Select the interrupt (IRQ) the card will use.**
   This is done at the "Interrupt Level Select" prompt. Be sure to check this.

2. **Set the base address of the ES3210 memory to any available (unused) location.**
   This is done at the "Memory Base Address Selection" prompt.

Note – The default setting is "Memory Mapped Disable." The Solaris driver will not work with this setting; you must change it.

   Be sure that the address you choose is not being used by some other adapter, particularly an ISA adapter. Note that the EISA configuration utility cannot accurately detect conflicts with ISA cards; it relies on information you enter about these devices to determine if conflicts exist.

3. **Choose a DMA channel.**
   This is done at the "DMA Channel Select" prompt. If you choose DMA channel 0, 1, 2, or 3, DMA will *not* be used.

Valid Configurations

The following parameters are valid for the Racal InterLan ES3210:

• IRQ	3, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15
• Memory Base Address	0xC0000, 0xC4000, 0xC8000, 0xCC000, 0xD0000, 0xD4000, 0xD8000, 0xDC000
• DMA Channel	Disable, 0, 1, 2, 3, 5, 6, 7

Known Problems and Limitations

The current release of the Solaris `riles` driver causes the network performance to degrade considerably when the Ethernet adapter is configured to use a DMA channel of 5, 6, or 7. Even though these values are valid, it is best not to use them.

SMC Elite32 Ultra (8232)

Description

The SMC Elite32 Ultra (8232) board is an EISA based Ethernet controller supporting 10Base-T, AUI, and BNC networks.

Although the hardware supports a Bus Master DMA mode of operation, the Solaris drivers do not make use of it.

The SMC Elite32 Ultra board is supported by the Solaris `smceu` driver.

Device Configuration

Preparing for Configuration

- The board is software configured using the EISA configuration utility along with an EISA configuration file supplied with the board by SMC. There are no jumpers on the board.
- The configuration utility allows the enabling or disabling of Bus Master Mode. The Solaris drivers do not operate the card in Bus Master Mode even if the mode is enabled. It does not matter which setting is selected by the configuration utility.
- You may use the configuration utility to select which Network Connection (Media) Type to use. 10Base-T is always enabled. If your network is AUI or BNC, you must use the configuration utility to ensure that the correct Network Connection Type is selected.
- The configuration utility also allows selection of the IRQ and base RAM address used by the board. You must choose values for these settings that do not conflict with other boards in the system. IRQ settings should be edge-triggered.

The optional ROM is not used by the Solaris drivers and should be disabled.

Configuring the Device

Use the EISA configuration utility to select the desired IRQ and memory base address. Ensure that the Network Connection Type is correct for your network. Set the ROM base address to Disabled.

Valid Configurations

The following parameters are valid for the SMC Elite32 Ultra (8232):

• Network Type	AUI or BNC; 10Base-T
• IRQ	3, 5, 7, 9, 10, 11, 15; Edge
• RAM address	0xc0000 to 0xee000, 8K increments
• ROM address	Disabled

The board's I/O address is determined by slot number.

Known Problems and Limitations

- SMC's own EZStart diagnostic hangs when testing the board in a Dell Omniplex 466. The card does work in a Dell Omniplex 590 machine. If in doubt, run the diagnostic provided by SMC.
- The SMC Elite32C Ultra fails to handle RPL request packets as a netboot server.

SMC Ether 10/100 (9232)

Description

The SMC Ether 10/100 (9232) board is an EISA-based Ethernet controller supporting both 10Base-T and 100Base-TX networks. Although the hardware supports a DMA mode of operation, the Solaris drivers do not make use of it.

The SMC Ether 10/100 board is supported by the Solaris `smcf` driver.

Device Configuration

Preparing for Configuration

- The board is software configured using the EISA configuration utility along with the file supplied by SMC. There are no jumpers on the board.
- The board can be configured for either 10 Mbps or 100 Mbps. Operation at the higher speed using the RJ-45 connector requires use of a Category 5 UTP (Unshielded Twisted Pair) cable.
- The EISA configuration utility also allows setting of the IRQ and DMA channels. The Solaris drivers do not make use of the DMA capabilities of the board, and do not require the selection of any particular DMA channel. The optional ROM is not used by the Solaris drivers and should be disabled.

Configuring the Device

Use the EISA configuration utility to select the desired network speed and IRQ. Set the ROM base address and DMA channel to Disabled.

Valid Configurations

The following configuratiions are valid for the SMC Ether 10/100:

• Speed	10 Mbps or 100 Mbps
• IRQ	3, 5, 7, 9, 10, 11, 15
• DMA Channel	Disabled
• ROM Address	Disabled

The SMC Ether 10/100 I/O address is determined by slot number. The DMA channel and ROM are not used.

SMC EtherEZ, EtherCard Elite16 Ultra, EtherCard PLUS Elite16, EtherCard PLUS (8416, 8216, 8013, 8003)

Description

The SMC 8416, 8216, and 80*x*3 family of cards are Ethernet adapters for ISA and Micro Channel bus architectures. An updated Solaris `smc` driver is provided to support the SMC EtherEZ (8416) Ethernet adapter. This updated driver supersedes the existing `smc` driver and will continue to support the SMC EtherCard Elite16 Ultra (8216) family of ISA bus Ethernet adapters and all the previous SMC/WD 8013 EtherCard PLUS Elite16 and EtherCard PLUS Elite/A families of ISA and Micro Channel architecture Ethernet adapters, and the EtherCard PLUS (8003) family of Ethernet adapters. The same device configuration information supplied for the SMC 8216 and 80*x*3 network adapters in the *x86 Device Configuration Guide* is repeated here for your convenience. The one exception is that the SMC EtherEZ (8416) adapter must have the Plug and Play setting disabled using the software setup program.

Device Configuration

Preparing for Configuration

Since memory is shared, it is necessary to disable the motherboard cache in the region where the Ethernet shared memory is mapped.

Avoiding Possible Device Conflicts

- AST systems that have DPT boards with the AST BIOS installed are known to conflict with SMC cards set to I/O port 0x300. For these system configurations, set the SMC card to a valid setup that does not use I/O port 0x300.
- Wyse Decision systems are known to conflict with SMC cards set to I/O port 0x300. For these system configurations, set the SMC card to a valid setup that does not use I/O port 0x300.
- The EtherCard PLUS (8003) board has a limited amount of on-board memory, which causes very poor NFS™ system performance. To avoid this problem, it is essential that NFS system mounts over the 8003 interface use a 4-Kbyte read/write buffer size. See the `mount_nfs(1M)` manual page for

more details on configuring NFS. This problem can also impact installation of Solaris for x86 over the network, causing occasional NFS complaints (which can be ignored).

- Since Solaris for SPARC has 8-Kbyte defaults, SPARC NFS file servers will interact poorly with 8003 adapters until the buffer sizes are reduced.

Configuring the Device

Software Procedure

1. **Consult your Device Configuration Work Sheet to see if your SMC network adapter needs to be reconfigured.**

2. **If necessary, reconfigure using the software setup program provided by SMC.**

Software Procedure for the SMC EtherEZ (8416)

Use the following steps in addition to the previous software procedure steps:

Note – The SMC EISA configuration utilities don't properly configure the SMC EtherEZ (8416). Instead, use the EZSETUP program as explained below.

---

1. **Install the EZSETUP program with SMC's EZSTART program.**
   Choose the Custom Install button and install the EZSETUP program which is listed under Miscellaneous Utilities.

2. **Run the EZSETUP program with the disable Plug and Play option:**

```
C:> ezsetup -nopnp
```

3. **Run EZSETUP with no options.**

4. **Answer the configuration questions, being sure to disable automatic cable type detection and Plug and Play.**

Hardware Procedure

1. **Consult your Device Configuration Work Sheet to verify that your SMC network adapter does not need to be configured.**

2. **If you must set jumpers, refer to the SMC documentation for the procedure.**

Valid Configurations

SMC EtherCard Elite16 Ultra (8216*xxx)* and SMC EtherEZ (8416*xxx*) network adapters use software procedures to configure the following:

Shared Memory Address	Between 0xC0000 and 0xDE000

The information in the following table is only used for EtherCard PLUS (WD/SMC 8003*xxx)* cards that use jumpers to set the configuration:

IRQ	I/O Address	Base Memory Address (Board RAM)
3	0x280	0xD0000
5	0x2A0	0xD4000
5	0x300	0xD4000

Known Problems and Limitations

- The SMC EtherCard Elite16 Ultra cards (8216*xxx*) should be installed in a 16-bit slot. Data corruption may occur if an 8-bit slot is used.
- A client desktop computer with an SMC EtherCard PLUS (8003) cannot be booted from a network.

FDDI Network Adapters

Cabletron FDDI F70*xx*

Description

The Cabletron FDDI F70*xx* family of adapters is based on the Motorola MC68840 FDDI chip. All the F70*xx* adapters have the same functionality; the only difference is the physical transport media and type of connectors.

The Cabletron F7069 (FDDI, Multimode Fiber) adapter has been tested to work with the `cbtnf` driver. Additional adapters in the family have not been tested but may work.

Device Configuration

Preparing for Configuration

- Ensure that the adapter is securely inserted into one of the EISA slots on the system.
- Make sure you have the right combination of adapter and connectors.
- To configure the adapter, use the EISA configuration utility and the configuration file supplied with the adapter.

Configuring the Device

To enable the Cabletron FDDI network *after* the system has been installed, do the following:

1. **Add a host name and IP address to** `/etc/hosts`**, if it is not already there.**
2. **As root, type:**

```
# echo host-name > /etc/hostname.cbtnf0
```

   where *host-name* is the host name in `/etc/hosts`.

3. **Reboot the system.**

Valid Configurations

The following parameters are supported for Cabletron FDDI F70*xx* adapters:

• IRQ	3, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15
• Board Status	Enable

Known Problems and Limitations

- The current `cbtnf` driver does not support installing or booting from a network server.
- When the system is heavily loaded, the interface may remain down after trying to use `ifconfig` to manually configure it down then up.

Audio Cards

Sound Blaster Pro

Description

The Creative Labs Sound Blaster Pro audio cards are DMA-capable ISA bus plug-in cards. They provide 8-bit mono and stereo digitized sound recording and playback over a wide range of sampling rates. Each card also includes a digital sound processor and mixing capability.

Note – The features and interfaces that are supported by the Solaris `sbpro` device driver are described in the `audio(7)` and `sbpro(7)` manual pages.

Device Configuration

Preparing for Configuration

- If you have a Sound Blaster Pro card with a nonstandard DMA setting, you must install Solaris x86 first, and then edit the `sbpro.conf` file.
- You must know the hardware jumper settings for the I/O address, interrupt request (IRQ), and DMA channel.
- Device configuration information is stored in the `sbpro.conf` file, usually in the `/platform/i86pc/kernel/drv` directory. The `sbpro.conf` file supports Sound Blaster Pro cards with factory default DMA settings.

Avoiding Possible Device Conflicts

- Be sure the I/O address jumper setting on your Sound Blaster card does not conflict with any other card in your system. If it conflicts, reconfigure the setting.
- The Sound Blaster Pro card cannot share IRQ settings with any other card installed in your system. If the hardware-jumpered IRQ setting conflicts with any other device, change the IRQ jumper setting on the Sound Blaster card to one listed under “Valid Configurations.” The most common conflicts occur with the `LPT1` parallel port, a serial port, or network card.

Configuring the Device

Hardware Configuration

1. **Consult your Device Configuration Worksheet to see if your Sound Blaster card needs to be reconfigured.**
2. **If the card's I/O address conflicts with another device, remove the card and change the I/O address using the manufacturer's instructions.**
3. **If the card's jumpered IRQ conflicts with another device, change the IRQ parameter using the manufacturer's instructions.**
4. **If the jumpered DMA channel conflicts with another device, change the DMA parameter using the manufacturer's instructions.**
5. **Record any changes in I/O address, DMA channel, or IRQ setting of the board on your Device Configuration Worksheet.**

Enabling Support for Sound Blaster Pro

1. **Install Solaris x86.**
2. **Become root.**
3. **If you changed the card's DMA channel to a value other than 1, update the `sbpro.conf` file:**

   a. **Change directories to the location of the kernel configuration files:**

```
# cd /platform/i86pc/kernel/drv
```

   b. **Edit the `sbpro.conf` kernel configuration file.**
   This is an ASCII file that can be edited using any text editor, such as `vi`. Change the `dma-channels` property for the SBPRO entry whose I/O address and IRQ setting match the hardware setting of your card.

   c. **Save your changes and exit the editor.**

4. **Remove the boot diskette from the drive if you have not already done so.**

5. **Perform a reconfiguration boot to make your changes take effect:**

```
# touch /reconfigure
# reboot
```

Valid Configurations

The possible settings for the Sound Blaster Pro card are listed here. Defaults are underlined.

- I/O Address 0x220, 0x240
- IRQ 2, 5, 7, 10
- DMA Channel 0, 1, 3

Known Problems and Limitations

- Output volume is controlled by software. Be sure the volume thumbwheel on the back of the card is turned all the way up to the maximum volume setting; otherwise you may not hear any sound.
- Microphone input is treated as a mono source; however, all the jacks on the back of the Sound Blaster card are stereo jacks. If your microphone has a mono plug, convert it to stereo using an appropriate adapter.

Sound Blaster 16/Sound Blaster AWE32

Description

The Creative Labs Sound Blaster 16 and Sound Blaster AWE32 audio cards are DMA-capable ISA bus plug-in cards. They provide 8- and 16- bit mono and stereo digitized sound recording and playback over a wide range of sampling rates, and each includes a digital sound processor and mixing capability.

Note – Some of the cards also support more advanced audio features, such as FM synthesis, advanced signal processing, advanced wave effects, and MIDI capability; however, the `sbpro` driver does not currently support these advanced features. The features and interfaces that are supported by the Solaris `sbpro` driver are described in the `audio(7)` and `sbpro(7)` manual pages.

Note – Some Sound Blaster cards support optional non-audio capabilities such as SCSI interfaces and CD-ROM interfaces. These interfaces are not supported by the `sbpro` driver. The Sound Blaster 16 optional SCSI-2 interface is supported by the Solaris `aic` driver. See the "Adaptec AIC-6360/ AHA-1522A/AHA-1520A/AHA-1510A/AHA-1530P/1532P HBAs/Sound Blaster 16 SCSI-2 (SCSI)" Device Reference Page for configuration information for the SCSI controller on this card.

Device Configuration

Preparing for Configuration

- If you have a Sound Blaster 16 card with IRQ and DMA jumpers, the jumper settings on the card will determine the IRQ and DMA channels to be used. However, if you have a SoundBlaster 16 card without audio IRQ and DMA jumpers or a Sound Blaster AWE32 card, you must install Solaris x86 first and then edit the `sbpro.conf` file. To do this, you must know the I/O address jumper setting of the card and what IRQ and DMA channels you plan to use.
- The audio subsystem of the Sound Blaster 16 needs its own I/O (port) address and an IRQ, distinct from those of the optional SCSI subsystem.

Avoiding Possible Device Conflicts

- Be sure the I/O address jumper setting on your Sound Blaster card does not conflict with any other card in your system; if it does, reconfigure the jumper setting.
- If your Sound Blaster card has both an audio and a SCSI-2 interface, select an I/O address for each interface to prevent conflicts with other configured devices.
- The Sound Blaster card cannot share IRQ settings with any other card installed in your system. The most common conflicts occur with the `LPT1` parallel port, a serial port, or network card.
  - If a hardware-jumpered IRQ setting conflicts with any other device, change the IRQ jumper setting on the Sound Blaster card to one listed under "Valid Configurations."
  - If your Sound Blaster card does not have an audio IRQ jumper, the IRQ used is determined by the entry you edit in the `sbpro.conf` file. In this case, choose an IRQ that does not conflict with any other device in the system.

Configuring the Device

Hardware Configuration

Note – Make sure you set the jumpers for the audio interface and *not* for the SCSI, if your Sound Blaster card has both an audio and a SCSI-2 interface.

---

1. **Consult your Device Configuration Worksheet to see if your Sound Blaster card needs to be reconfigured.**
2. **If the card's I/O address conflicts with another device, remove the card and change the I/O address according to the manufacturer's instructions.**

Note – If you have a Sound Blaster 16 card without audio IRQ and DMA jumpers or you have a Sound Blaster AWE32 card, you must specify the `dma-channels` property in the `sbpro.conf` file after Solaris is installed. See "Enabling Support for Sound Blaster 16 and AWE32."

---

3. **If you have a Sound Blaster 16 SCSI-2 and you intend to use the SCSI interface, you may have to set the jumpers that control the SCSI I/O address.**
   See the “Adaptec AIC-6360/Sound Blaster 16 SCSI-2 (SCSI)” Device Reference Page for information on setting the Sound Blaster 16 SCSI-2 card.

4. **Record any changes on your Device Configuration Worksheet.**

Enabling Support for Sound Blaster 16 and AWE32

1. **Install Solaris x86.**

2. **Become root.**

Note – If your Sound Blaster 16 card has audio DMA jumpers, the driver uses the DMA channels specified by those jumper settings, and you should not specify the `dma-channels` property in the `sbpro.conf` file. Instead go to step 4.

---

3. **If you have a Sound Blaster AWE32, or a Sound Blaster 16 card that has no audio IRQ and DMA jumpers, you must change the IRQ setting in the `sbpro.conf` kernel configuration file. Follow these steps:**

   a. **Change directories to the location of the kernel configuration file:**

```
# cd /platform/i86pc/kernel/drv
```

   b. **Edit the `sbpro.conf` kernel configuration file.**
   This file is in ASCII text that can be edited using any text editor, such as `vi`. The `sbpro.conf` file that is installed with Solaris contains detailed instructions and examples. Be sure that the specified IRQ and DMA settings do not conflict with other devices on the system.

   c. **Find the `SB16` entry that corresponds to your card’s jumpered I/O address, and that contains the “interrupts” value that corresponds to the IRQ you want to use.**

   d. **Specify two DMA channels in the `dma-channels` property.**
   The first is for an 8-bit DMA channel, the second for a 16-bit DMA channel.

   e. **Save your changes and exit the editor.**

4. **Remove the diskette from the drive if you have not already done so.**
5. **Reboot the system as shown here:**

```
# touch /reconfigure
# reboot
```

Valid Configurations

The settings for the Sound Blaster cards are listed with the defaults underlined.

Sound Blaster 16/Sound Blaster AWE32:

- I/O address 0x220, 0x240, 0x260, 0x280
- IRQ 2, 5, 7, 10
- 8–bit DMA channel 0, 1, 3
- 16–bit DMA channel 5, 6, 7

Sound Blaster 16 SCSI-2:

- I/O address 0x140, 0x340
- IRQ 11
- DMA channel (not used) 0, 5, 6, 7

Known Problems and Limitations

- Output volume is controlled by software. Be sure the volume thumbwheel on the back of the card is turned all the way up to the maximum volume setting; otherwise you may not hear any sound.
- Microphone input is treated as a mono source; however, all the jacks on the back of the Sound Blaster cards are stereo jacks. If your microphone has a mono plug, convert it to stereo using an appropriate adapter.
- Sound Blaster 16 and Sound Blaster AWE32 cards are both recognized as Sound Blaster 16 cards.
- The Sound Blaster 16 optional SCSI-2 interface cannot be used as the primary disk controller because it has no BIOS. The system must be booted from a disk attached to another controller.

PC Card Hardware

PC Card Adapters

Description

PC Card (PCMCIA) adapters, such as the Intel i82365SL, Vadem VG365/VG465/VG468/VG469, Cirrus Logic PD6710/PD6720, Ricoh RF5C366, and Toshiba support up to eight Type I, II, or III sockets.

Device Configuration

Warning – The following problem has occurred on machines using the Vadem VG469 PC Card adapter chip. To avoid the problem, ground yourself by touching some metal on the computer case while inserting and removing the PC Card devices.

Sometimes the PC Card adapter will cause the machine to lock up. The `prtconf` command output may indicate that the device is in two sockets after a card is inserted in one socket. Subsequent card insertion and removal may not be detected, and the machine locks up. The machine must then be reset or power cycled.

Preparing for Configuration

- Other adapters that use chips based on the Intel i82365SL design may also be supported. See the latest Solaris x86 Hardware Compatibility List for supported systems.
- If you have an add-on PC Card adapter, install it on your system prior to Solaris installation.
- Some notebook computers have their built-in PC Card adapter disabled by default. Enable it prior to Solaris installation.
- If your system has a supported PC Card adapter configured at a known address, it should be recognized automatically. No manual configuration should be necessary.

- Requirements for a system depend on the combination of devices to be used. A typical two-socket notebook computer needs at least 8 Kbytes of address space, 16 bytes of I/O space, and three free IRQs. Following are general guidelines:

Address space	At least 8 Kbytes are required with 4 Kbytes per socket in the 640K-1MB range (not necessarily contiguous); if you have three sockets, at least 12 Kbytes are needed
I/O space	At least 8 and preferably 16 bytes per socket
IRQs	One per socket, plus an IRQ for the `pcic` device driver, itself

Configuring the Device

Initial Installation and Configuration

1. **Consult your Device Configuration Worksheet for address space, I/O space, and IRQs already used by system devices.**

2. **Insert the PC Card adapter.**

3. **Install Solaris x86, including the PCMCIA packages in the SUNWpcmc cluster.**
   - If you choose to install the Entire Distribution, the PCMCIA packages are automatically included. After installation, the next reboot will automatically perform the necessary reconfiguration.
   - If you choose any other distribution, such as the End User Distribution, select Customize from the choices at the bottom of the Software Selection screen. Then choose PCMCIA Support from the scrolling list on the Customize Software screen. After installation, the next reboot will automatically perform the necessary reconfiguration.

4. **Reboot the system.**

Configuring PC Card Adapters

The Solaris PC Card nexus driver automatically allocates address space, I/O ports, and IRQs to new cards when they are inserted. To do this, the nexus driver must have sufficient free resources and recognize what resources are already used by other drivers.

- During installation of the PC Card software, a system initialization script maps out the resources used by all the other devices in the system. Resources not known to be used by another driver are assumed free for use by PC Card drivers.

Note – If you are using a notebook with a docking bay, keep the notebook in the docking bay during the installation of the PC Card software. This ensures that the system can identify the resources used by cards in the docking bay.

- Reconfiguration usually works automatically, but some machines may require that you provide information about resources already allocated. Three cases have been encountered:
  - *Case 1:* Some device drivers do not export properties describing the resources they use, so an automatic scan cannot determine what resources are allocated to those drivers. This situation is detected automatically by the scan, and the script prints out a warning message and request for manual assistance. See “Correcting Possible Conflicts” later in this Device Reference Page.
  - *Case 2:* Some machines may have devices for which no Solaris driver exists, and this can’t be detected automatically. You will have to enter the descriptions of their resource requirements manually.
  - *Case 3:* Some machines may have reserved additional ports, memory, or IRQs that are not detected by the automatic scan. In cases like these, the PC Card software may appear to configure properly, but some PC Card devices may simply not work (because they are sharing resources with other hardware). For example, some notebooks reserve an IRQ for power management use. In a case like this, read through the hardware documentation that accompanies the machine.

PC Card Resource Configuration Information

The resources available for PC Card devices are defined by three properties in the `pcic.conf` file:

`res-irq`
: This property should be a complete list of the IRQ levels available for use by the `pcic` driver. For example, if IRQ levels 3, 9, and 15 are available, they are listed as:

  `res-irq=3,9,15`

  Each PC Card I/O device that needs an interrupt is assigned a different IRQ, and the PC Card adapter uses one IRQ level. In this example, only two I/O PC Card devices can be used at the same time.

`res-memory`
: This property is a list of memory base and length pairs. The length is in number of 4-Kbyte pages available. For example, if there are two blocks of memory available, one starting at `0xcc000` with 8 pages available and another at `0xd0000` with 4 pages available, the property is set up as:

  `res-memory=0xcc000,0x8,0xd0000,0x4`

  Many notebook computers have all the memory between `0xcc000` and `0xeffff` available:

  `res-memory=0xcc000,0x14`

  If the notebook computer is to be used in a docking bay, be sure that the configuration also accounts for any devices installed in it.

`res-ioaddr`
: This property, like the `res-memory` property, is a list in bytes, and the base address refers to I/O space. For example, if 32 bytes of I/O space are available at `0x200` and 16 bytes are available at `0x300`, the property is listed as:

  `res-ioaddr=0x200,0x32,0x300,0x16`

If the available resources recorded by the PC Card software in the /kernel/drv/pcic.conf file include a resource that is actually in use by other devices in the system, you must manually edit the file to remove them. See “Correcting Possible Conflicts” below.

Note – Anytime the pcic.conf file is modified, you must reboot the system for the changes to take effect.

Correcting Possible Conflicts

When the PC Card software cannot automatically determine which resources are available, information must be added to the /kernel/drv/pcic.conf file to identify the unavailable resources. The resources available for PC Card devices are defined by the res-irq, res-memory, and res-ioaddr properties.

1. **To include information about unavailable resources, edit the** /kernel/drv/pcic.conf **file and add** #exclude: **lines.**
   a. **Each line that describes a set of reserved resources must begin with** #exclude:.
   b. **Non-blank characters after the colon are treated as a comment and ignored.**
   For example, the string “pm” in the example below shows that you are disabling IRQ 15 because of a conflict with the Power Management resource.
   c. **The next field should specify the** res-irq, res-memory, **or** res-ioaddr **property. See** pcic(7).
   d. **For** res-irq **lines, the following field should be a decimal IRQ number.**
   For example, if a notebook computer uses IRQ 15 for Power Management, you can exclude IRQ 15 by adding the following line:

```
#exclude:pm res-irq 15
```

   The PC Card software would then know that IRQ 15 is not available for use by PC Card devices.

e. **For `res-memory` and `res-ioaddr` lines, the next two fields should be a hexadecimal base and byte count. The leading `0x` should not be used.** For example, if the `smc` device driver does not identify allocated resources automatically, add the following lines to the `pcic.conf` file:

```
#exclude:smc res-irq 3
#exclude:smc res-ioaddr 280 10
#exclude:smc res-memory dc000 2000
```

The `#exclude:` lines identify IRQ 3, ports `0x280-28F`, and addresses `0xDC000-0xDDFFF` as *unavailable* for PC Card device use.

2. **Reboot the system.**

Changing the Default IRQ

The optional (`smi`) property can be defined in the `/kernel/drv/pcic.conf` file. If specified, the `smi` property overrides the default IRQ level, used by the `pcic` driver. By default, the second to the last IRQ in the `res-irq` list is used. If that value is unusable, specify the IRQ level in the `smi` property.

1. **Become root.**
2. **To override the default IRQ level for the `pcic` driver, edit the `/kernel/drv/pcic.conf` file and add a line that contains '`smi=`'.** (Be sure to add this line before the **;** character in the file.) For example, to change to IRQ 9, add the following line to `pcic.conf` to make this resource *available* to the PC Card device:

```
smi=9
```

3. **Reboot the system.**

3Com EtherLink III (3C589) PC Card

Description

The 3Com EtherLink III (3C589) PC Card device is a credit-card-like form factor Ethernet adapter.

Device Configuration

Preparing for Configuration

- It is not possible to boot or install the Solaris operating environment using a 3Com EtherLink III PC Card device.
- If the 3Com PC Card device is recognized, the `pcelx` driver will be automatically loaded, ports and IRQs will be automatically allocated, and the special files will be automatically created (if they don't already exist).
- No manual configuration of the hardware is necessary or possible.

Configuring the Device

Initial Installation and Configuration

1. **Install Solaris x86, including the PCMCIA packages in the SUNWpcmc cluster or from a PC Card Driver Update.**
2. **Boot the system.**
3. **Insert the 3Com EtherLink III PC Card device.**

Identifying an Unrecognized Card

If you insert a 3C589 card and it isn't recognized (no special files created), use the `prtconf` command to try to identify the problem.

1. **Run the `prtconf` command to see if your 3C589 card is recognized.**
   A recognized device will appear at the end of the `prtconf` output.
   For example:

```
# prtconf
.   .   .
pcmcia, instance #0
    pcelx, instance #0
```

2. **If `pcelx` does not appear in the `prtconf` output, there is a problem with the PC Card adapter configuration or with the hardware. Check to see whether the problem is with the card or the adapter by trying to use the card on another machine and by seeing if it works on the same machine using DOS.**

Installing and Configuring Additional Network Cards

Because the 3C589 card is not supported during Solaris installation, you must update network configuration files before it can be used as a network interface.

1. **Create a `/etc/hostname.pcelx#` file (where `#` is a socket number) to specify the host name to be associated with this interface.**

2. **Add an IP address for the new host name to the file `/etc/inet/hosts`.**

3. **Ensure that the associated network is listed in `/etc/inet/netmasks`.**

4. **Ensure that the Name Service Switch `/etc/nsswitch.conf` configuration file includes the network and local services you need.**

5. **Reboot the system.**

Note – This process is described in *TCP/IP Network Administration Guide*.

Special Files

Device naming in `/dev` follows standard LAN device naming except that the PPA (Physical Point of Attachment) unit number is the socket where the card resides, not the instance. That is, for the `pcelx` driver, `/dev/pcelx0` (or PPA 0 of `/dev/pcelx`) is the card in socket 0, while a card in socket 1 is `/dev/pcelx1` (or PPA 1 of `/dev/pcelx`). See `pcelx(7)`.

Hot-Plugging

If you remove the 3C589 card, any information you send is discarded, and no error messages are given.

When you reinsert the card in the *same* socket, the device operates normally. The behavior is similar to temporarily disconnecting the device from the network.

Known Problems and Limitations

- Network services are automatically started when a system is booted. These services are not started when a network interface is added or shut down after the system has been brought up.
- On some systems, a 3Com EtherLink III PC Card Ethernet adapter can only be used in socket 0 and will not work if removed and plugged into another socket. This problem can be avoided by always plugging in your PC Card Ethernet adapter into socket 0.

Modem and Serial PC Card Devices

Description

A wide range of supported modem and serial PC Card devices are based on the 8250, 16550, or compatible UART at speeds up to 115 Kbps.

Device Configuration

Preparing for Configuration

- If a modem or serial PC Card device is recognized, the `pcser` device driver is automatically loaded, ports and IRQs allocated, and special files created (if they do not already exist).
- No manual device configuration is necessary or possible.

Configuring the Device

Initial Installation and Configuration

1. **Install Solaris x86, including the PCMCIA packages in the SUNWpcmc cluster or from a PC Card Driver Update.**
2. **Boot the system.**
3. **Insert the modem device or the serial device.**

Identifying an Unrecognized Device

If you insert a PC Card modem or serial device and it isn't recognized (no special files created under `/dev/cua` or `/dev/term`), use the `prtconf` command to try to find the problem.

1. **Run the `prtconf` command to see if your modem or serial card is recognized.**
   An unrecognized device will appear at the end of the `prtconf` output. For example:

```
# prtconf
.   .   .
pcmcia, instance #0
    PC,111.222/Data Masher (driver not attached)
```

2. **If your device is not recognized "`(driver not attached)`", use the `add_drv` command to add the name of your device as another known alias for `pcser` devices.**
   For example, type the following at the command line:

```
# add_drv -i '"PC,111.222/Data Masher"' pcser
```

Note – Include the double quotes in single quotes to keep the shell from stripping out the double quotes. Use the identification string listed in the `prtconf` output. The part of the string after the slash can be treated as a comment, so use the entire string in the `add_drv` command. See `add_drv(1M)`.

Identifying an Incorrectly Recognized Device

1. **Run the `prtconf` command to see if your modem or serial card is erroneously recognized.**
   If the device is incorrectly recognized as a memory card, for example, the output of the `prtconf` command could show:

```
pcmcia, instance #0
   pcmem, instance #0
       pcram, instance #0
```

2. **Determine why this is happening and manually update the `pcic.conf` file.**

Additional Configuration

When adding a new serial port or modem to the system, you often need to edit configuration files so that applications can use the new communications port. For example, the `/etc/uucp/devices` file needs to be updated to use UUCP and PPP. See "UUCP Databases and Programs" in *TCP/IP Network Administration Guide*.

Special Files

The serial devices located in `/dev/term` and `/dev/cua` are named by socket number. A card inserted in socket 0 is `pc0`, and socket 1 is `pc1`. See `pcser(7)`.

Hot-Plugging

If a modem or serial PC Card device is unplugged while it's in use, the driver returns errors until the card is replaced in the socket.

The device must be closed and reopened with the card reinserted before the device begins working again. The restart process depends on the application. For example, a `tip` session automatically exits when a card in use is unplugged. To restart the system, you must restart the `tip` session.

Known Problems and Limitations

Because manufacturers interpret the PC Card specifications in different ways, some devices do not work, or work poorly. Consult the latest Solaris x86 Hardware Compatibility List for supported modems.

SRAM and DRAM PC Card Devices

Description

A wide range of PC Card (PCMCIA) SRAM (Static RAM) and DRAM (Dynamic RAM) devices is supported. Flash RAM devices are not supported.

Device Configuration

Preparing for Configuration

- If a PC Card memory device is recognized, the `pcram` device driver is automatically loaded, the physical address allocated, and special files created (if they do not already exist).
- No manual configuration is necessary or possible.

Configuring the Device

Initial Installation and Configuration

1. **Install Solaris x86, including the PCMCIA packages in the SUNWpcmc cluster or from a PC Card Driver Update.**
2. **Boot the system.**
3. **Insert the card.**

Identifying an Unrecognized Device

If you insert a memory device and it isn't recognized (no special files created), use the `prtconf` command.

1. **Run the** `prtconf` **command to display the configuration recognized by the system.**
   A recognized device will appear at the end of the `prtconf` output.
   For example:

```
# prtconf
.  .  .
pcmcia, instance #0
    pcmem, instance #0
          pcram, instance #0
```

2. **If your memory device does not appear in the** `prtconf` **output, it is not supported and cannot be used with the** `pcram` **device driver.**

Special Files

The special files created for PC Card memory devices act like disks and have names in the form `/dev/dsk/c#t#d#p#` or `/dev/dsk/c#t#d#s#` (See `pcram(7)`). These are described below:

`c#`	controller #
`t#`	card technology type #, defined as follows: `0` Null—no device `1` ROM `2` OTPROM (One Time PROM) `3` UV EPROM `4` EEPROM `5` Flash EPROM `6` SRAM `7` DRAM
`d#`	device region of type #, usually zero
`p#`	`fdisk` partition #
`s#`	Solaris slice #

Note – A device name can be specified either by a partition name (`p#`) or a slice name (`s#`), but not both.

Using PC Card Memory Devices

Since the Solaris Volume Management software recognizes PC Card memory devices, no special `vold` configuration is required.

♦ **If you do not want to use** `vold` **to manage your PC Card memory devices, comment out the "**`use pcmem`**" line in the** `/etc/vold.conf` **file.**
To comment out a line in `/etc/vold.conf`, add a # character to the beginning of the line.

PC Card memory devices don't need to have file systems on them, though typically, before using a new PC Card memory card, you will want to create a file system on it. DOS PCFS is the best format to use. Although you can use virtually any file system format on a PC Card memory card, most other file system formats are platform-dependent, making them unsuitable for moving data between different types of machines. See "Using PCMCIA Cards" in Appendix G of *Solaris User's Guide*.

Note – If you want to redirect the output of a `tar` command (or `dd` or `cpio`) to a PC Card memory device, you *must* first create a file system on the card, using the `fdformat` command without arguments. The card will need to be reformatted before it can be written on again.

Hot-Plugging

If a memory card is removed while in use, the device driver returns errors until a memory card is inserted into the appropriate socket.

The device needs to be closed and then reopened with the card reinserted in order to get it working again. If you removed the card while it was in use as a file system, unmount the file system with the `umount` command. Then reinsert the card and remount the file system with the `mount` command.

If you interrupt a `tar` or `cpio` process by removing the card, you must stop the process, reinsert the card in the socket, and then restart the process.

Known Problems and Limitations

- The Solaris `pcmem` driver in this release is not capable of handling "combo" memory cards with multiple types of memory on them (for example, combined SRAM and nonvolatile FLASH). Inserting such a card into a system running the Solaris software may cause a system panic. Fortunately, most PC Card RAM adapters do not contain multiple memory technologies.
- Because the PC Card memory device is designed as a pseudo-floppy diskette type, the only utility that can be used for formatting is `fdformat(1)`.

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